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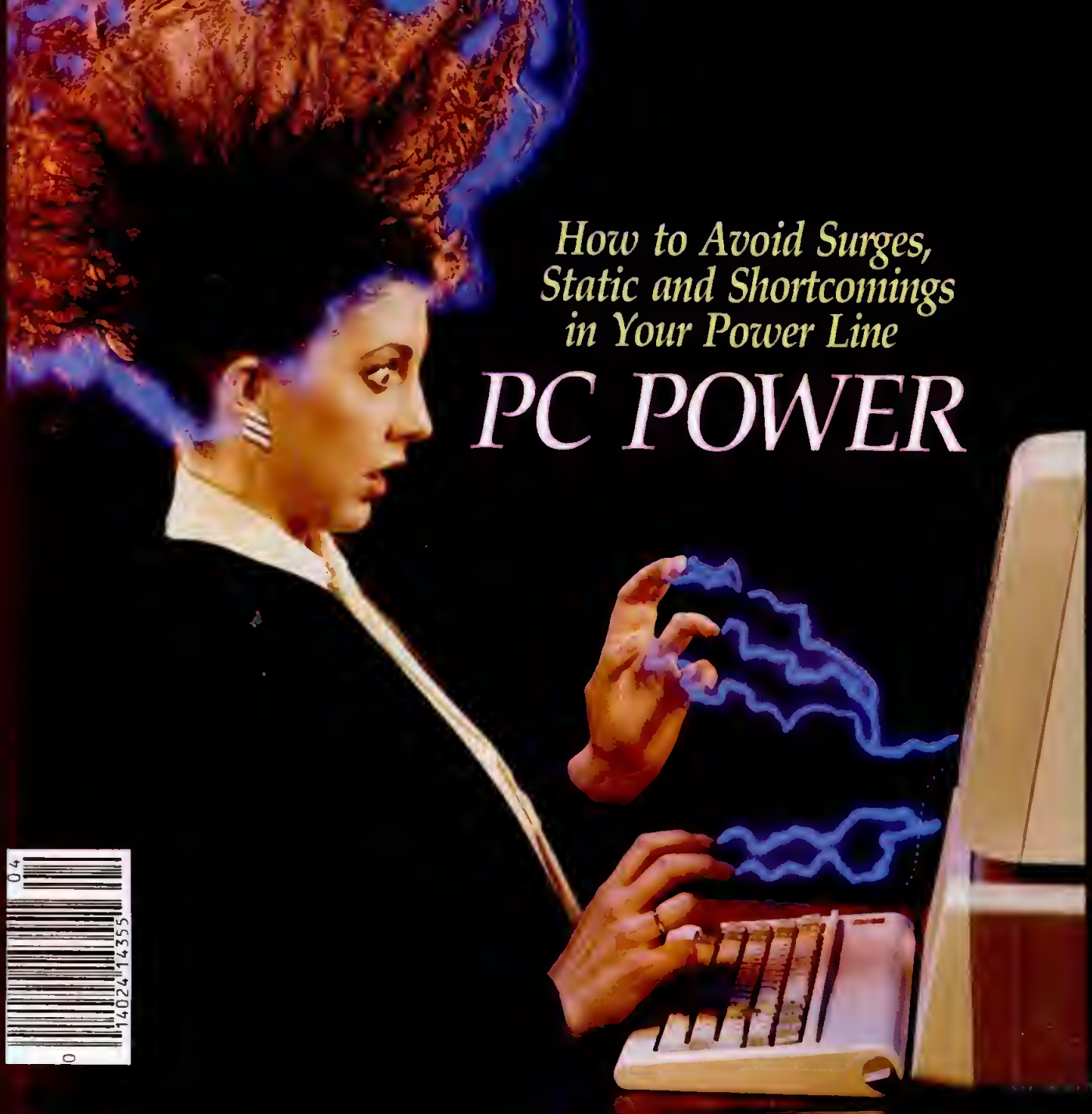

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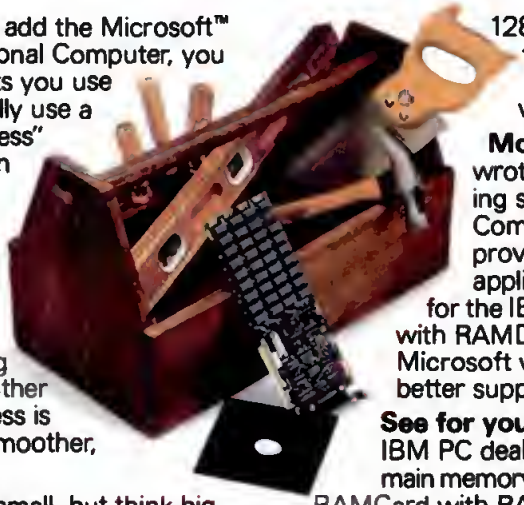

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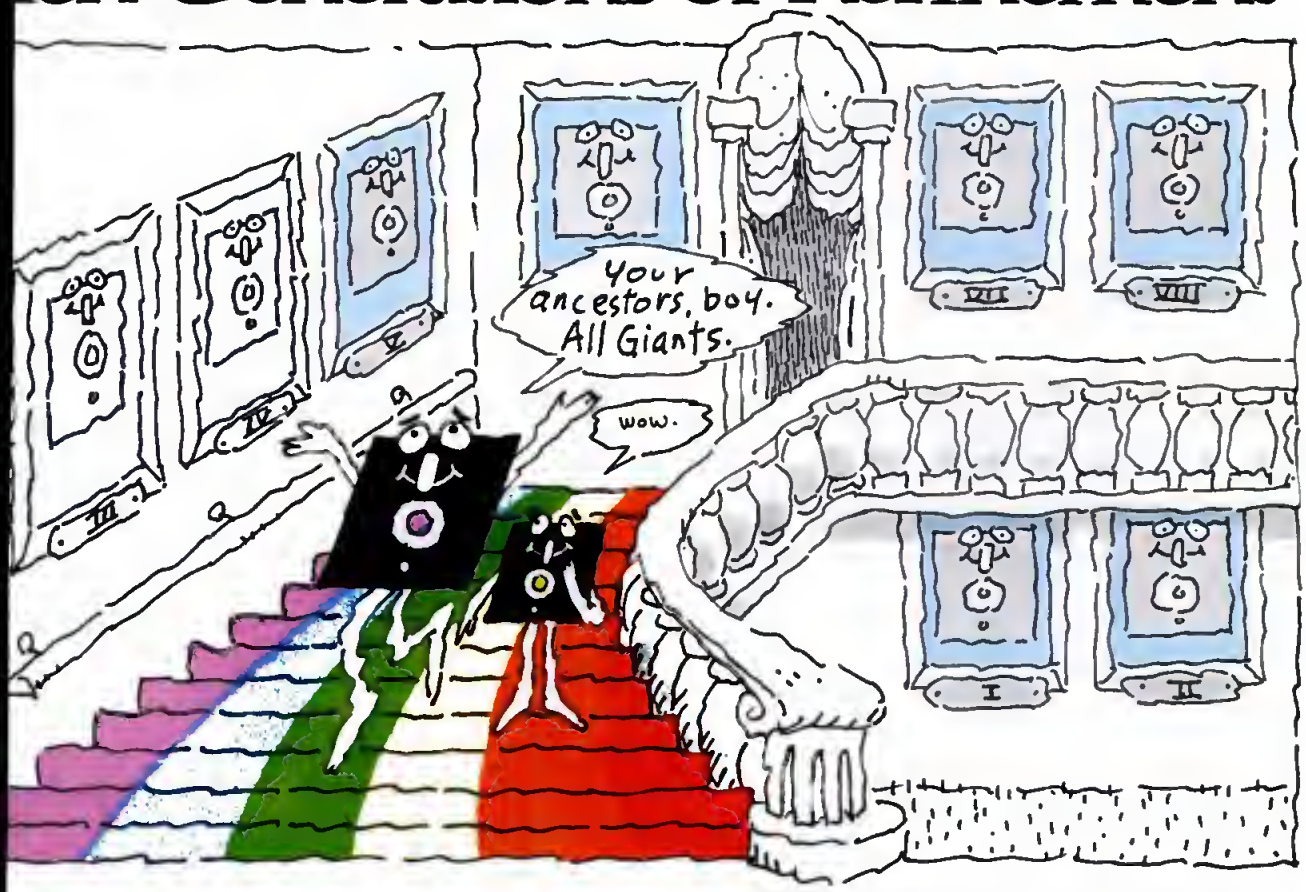

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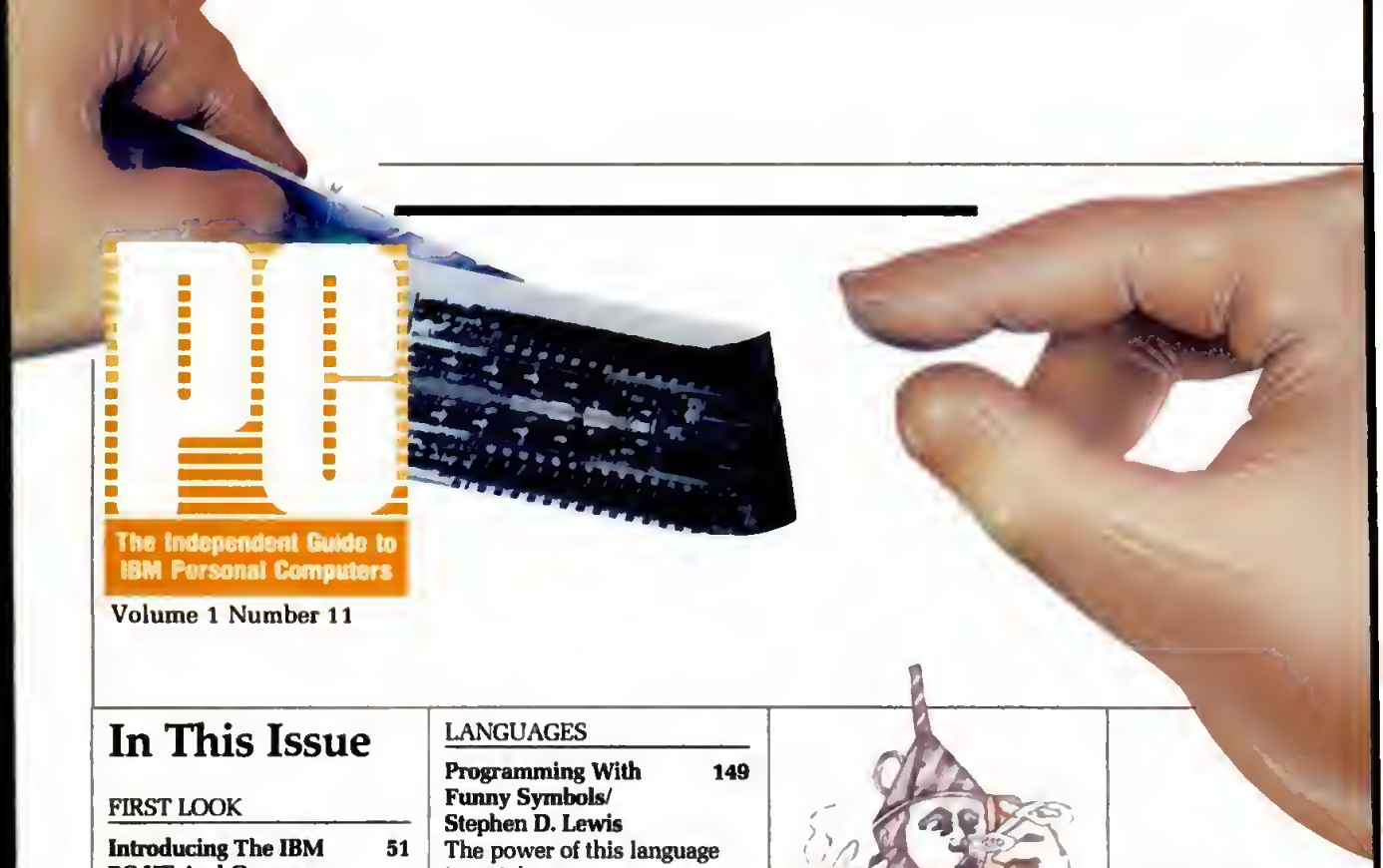

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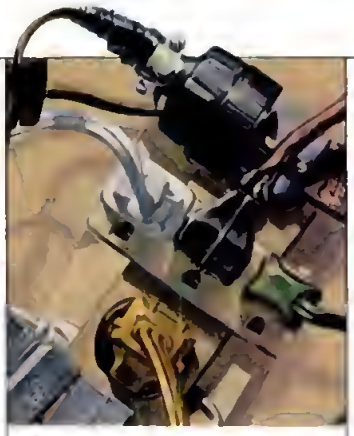

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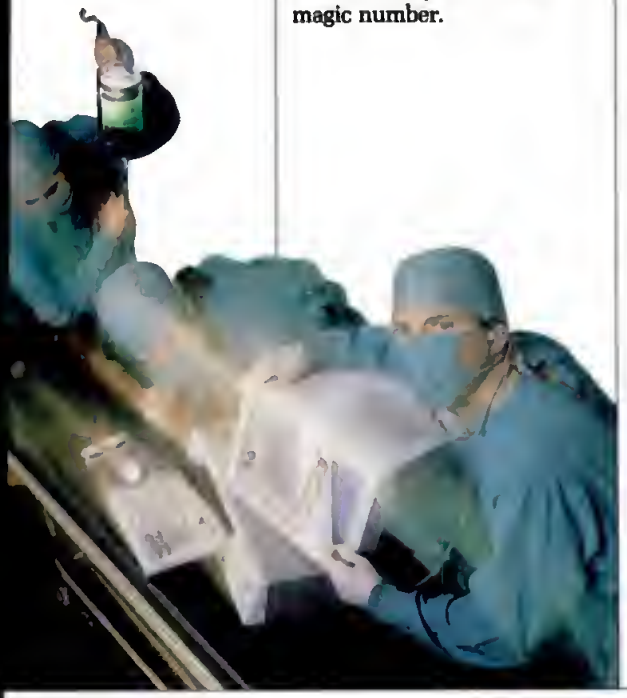

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Finally, aliens your kids can reason with instead of destroy.

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At Spinnaker, we don't believe in the "kill or be killed" concept behind most computer games. In fact, we believe computer games should be instructive. Not destructive. But just as importantly, they should be fun.

That's why IN SEARCH OF THE MOST AMAZING THING™ is designed to let your kids negotiate with aliens instead of destroying them. Because given the opportunity, kids enjoy using their minds.

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The Most Amazing Thing is out there somewhere. Finding it won't be easy. But relax, your kids will have the help of their old uncle Smoke Bailey. He'll give them a B-liner (sort of a cross between a hot air balloon and a dune buggy) to use on their journey. They'll have to learn how to fly the B-liner and navigate it through storms and fog. But before they do anything, your kids will have to talk to Old Smoke. He'll tell them about the Mire People and the strange language that they speak. He'll also tell them to avoid the dangerous Mire Crabs and how to get fuel for the B-liner.

Your kids will visit the Metallican Auction where they'll trade with the aliens for valuable chips. Your kids will then use these chips to buy things they'll need for their trip. And your kids will learn how to fly over the planet using their jet pack.

The Most Amazing Thing holds great powers, but it will take great skill, persistence and imagination to find it.

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IN SEARCH OF THE MOST AMAZING THING is written by Tom Snyder, educator and author of the best-selling Snooper Troops™ Detective Series.

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A Novel Approach to Computer Games.

Besides offering your children all of the above, IN SEARCH OF THE MOST AMAZING THING gives them an opportunity to develop their reading skills. Because included with the game is Jim Morrow's new novel The Adventures of Smoke Bailey.* So your children will have hours of fun reading the book or playing the game. And they'll be learning at the same time.

Parental Discretion Advised.

If you're a parent who would rather see your kids reason with aliens than destroy them, you've got plenty of reasons to ask your local software retailer for IN SEARCH OF THE MOST AMAZING THING. It's compatible with Apple,® IBM,® Atari,® and Commodore 64™ computers. And it offers so much fun you'll probably be tempted to play it yourself. Or you can write us directly at: Spinnaker Software, 215 First Street, Cambridge, MA 02142.

You'll find this is one computer game that won't alienate you from your children.

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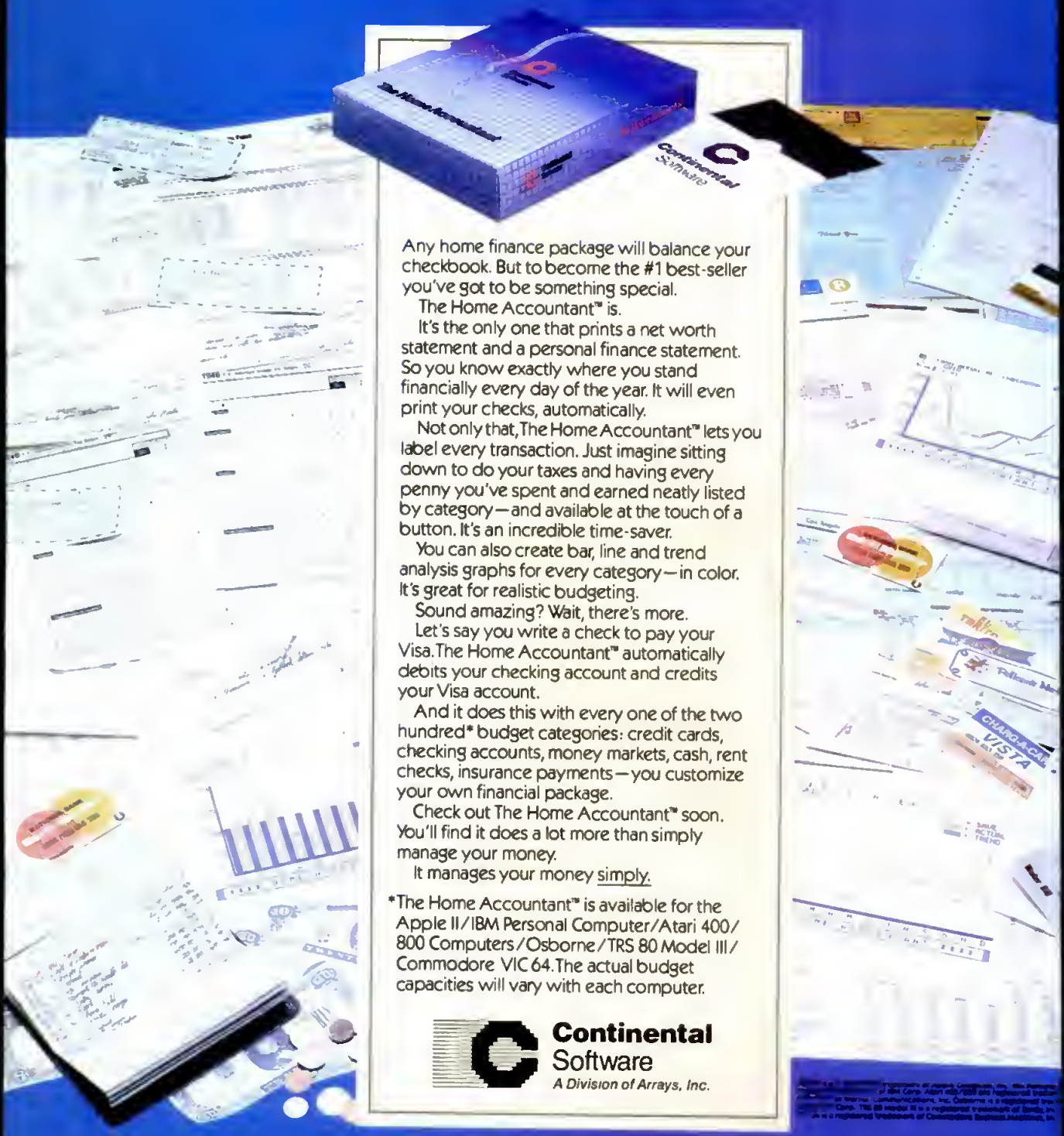

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ou the PC keyboard, the
nning and importance of
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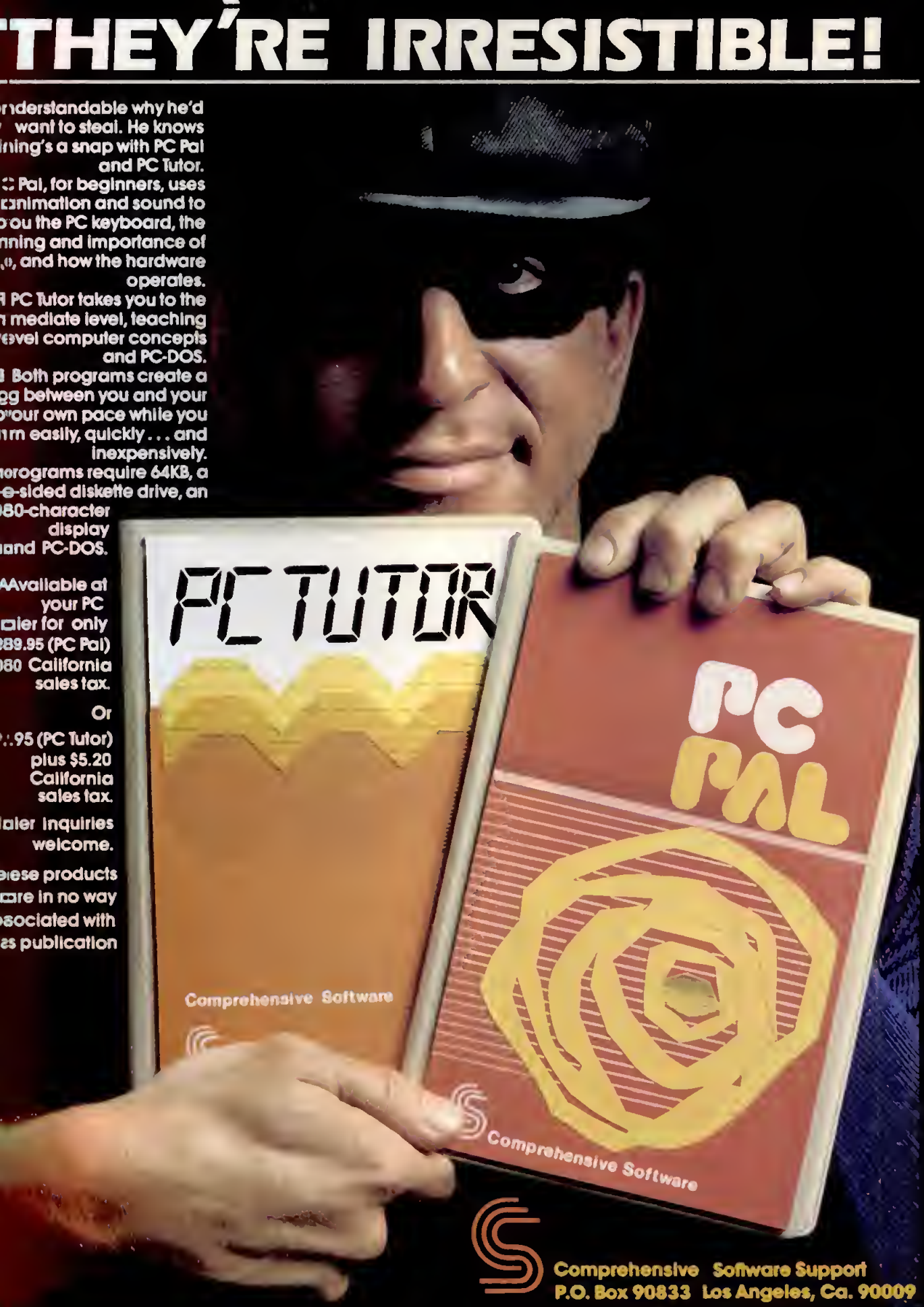

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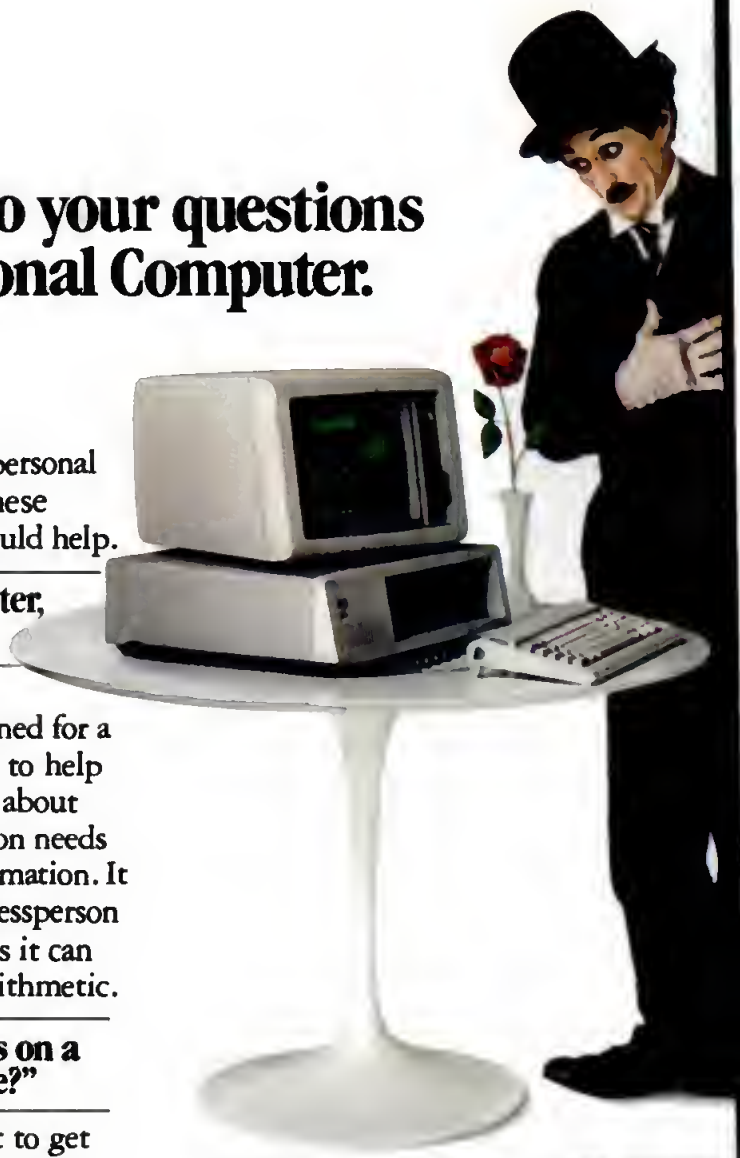
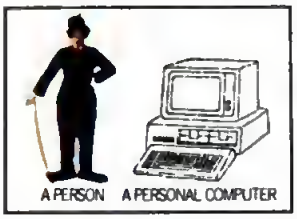
Simple answers to your questions about the IBM Personal Computer.



If you're personally interested in personal computers, but want to know more, these definitions, descriptions and details should help.

"Just what is a personal computer, and how can I use it?"

The IBM Personal Computer is a computer designed for a *person*. It's a tool to help accomplish just about anything a person needs to do with information. It can help a businessperson solve complex problems just as surely as it can help a small child improve his or her arithmetic.



"Suppose I've never had my hands on a computer. How 'easy' will it be?"

As with any new tool, you'll want to get comfortable with the IBM Personal Computer before putting it to serious use. You'll have some step-by-step reading, but our instructional literature involves you from the start. And the computer is on your side too—interacting with you as you learn.

There's no reason why you can't be executing programs and feeling good with the results within your first week. After a month, it should be clear that you've made a good investment, and you'll probably be telling your friends why they should get one.

"Is the IBM Personal Computer simp or more advanced than others?"

Both. Our system has been engineere with many advanced design features (see th chart) but their purpose is to m it simpler for you. Our ten fun keys are a good example. We them to save you a lot of ti and error. They are *advanced* fe that add to *simplicity* and e of operation, and that is typica our total design.

"What kind of software programs do you have to help me?"

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we offer programs that help handle
everything from accounting to
inventory and payroll record
keeping. We also have
carefully chosen programs for
educational use, intelligent games, a
processing program, plus communications
ages that connect you and your computer to
de information services via your telephone
device called a modem.

w expensive and how expandable is it compared to others?"

Because of the extraordinary amount of
nced, built-in features available in the IBM
nal Computer, it can give you more
quality, power and performance
for your money. You're also
buying extraordinary
expandability—beginning
with user memory that can
be increased up to 32
times. (In the chart at right,
eedn't be a technical whiz to add up all

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Microprocessor
16-bit, 8088*
Auxiliary Memory
2 optional internal diskette drives, 5¼", 160K bytes or 320K bytes per diskette
Keyboard
83 keys, 6 ft. cord attaches to system unit*
10 function keys*
10-key numeric pad
Tactile feedback*
Diagnostics
Power-on self testing*
Parity checking*

Display Screen
High-resolution*
80 characters x 25 lines
Upper and lower case
Green phosphor screen*
Operating Systems
DOS, UCSD p-System, CP/M-86†
Languages
BASIC, Pascal, FORTRAN, MACRO Assembler, COBOL
Printer
All-points-addressable graphics capability
Bidirectional*
80 characters/second
18 character styles
9 x 9 character matrix*

Permanent Memory
(ROM) 40 bytes*
Color/Graphics
Text mode
16 colors*
256 characters and symbols in ROM*
Graphics mode
4-color resolution: 320h x 200v*
Black & white resolution: 640h x 200v*
Simultaneous graphics & text capability*
Communications
RS-232-C interface
Asynchronous or SDLC protocols
Up to 9600 bits per second

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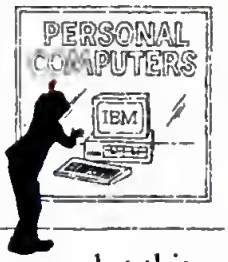

Ask your dealer to run the software programs that interest you most, and get your hands on the system yourself. Then you'll begin to see what this tool for modern times can do for *you*.

For more information on where to buy the IBM Personal Computer, call 800-447-4700. In Alaska or Hawaii, call 800-447-0890.

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16 ☐ Purchasing
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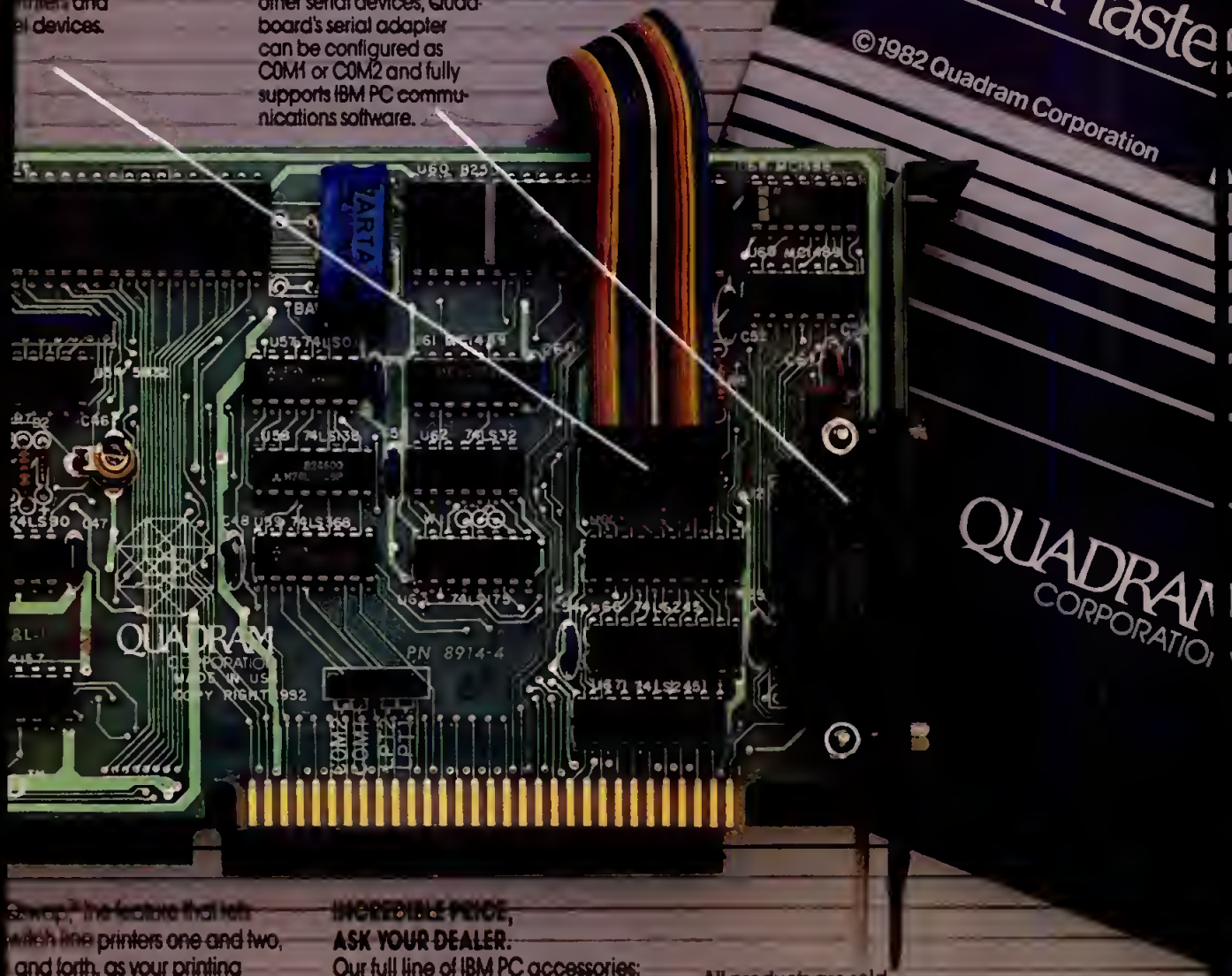

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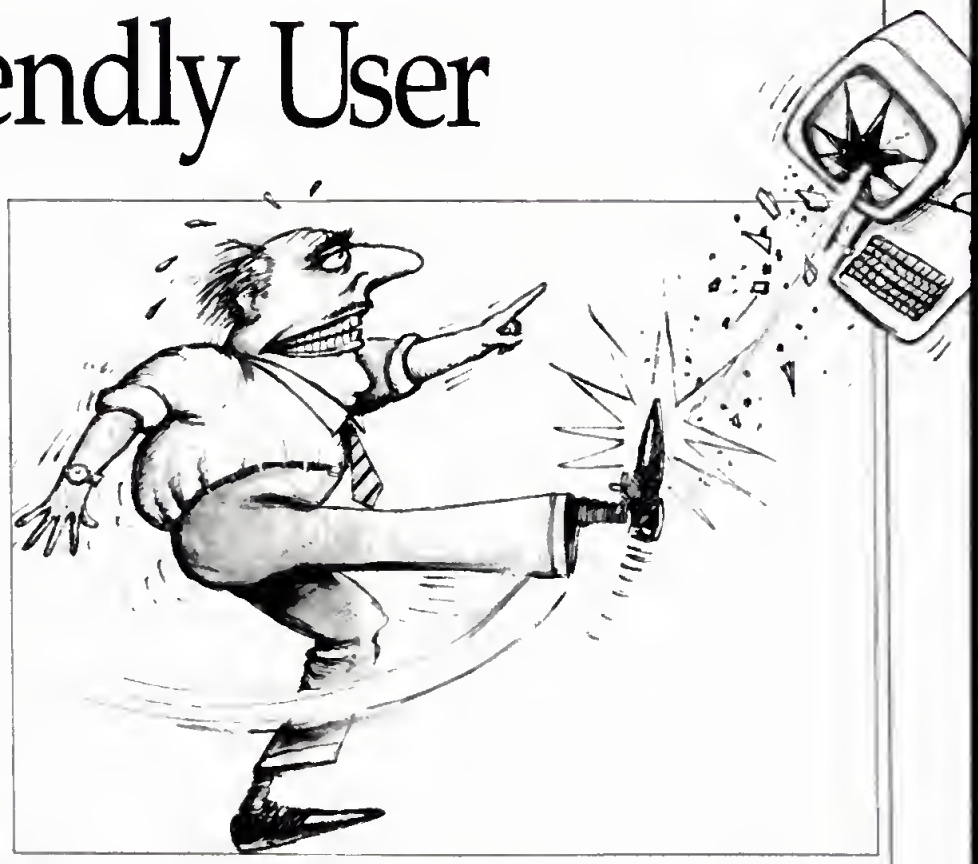
spite a hectic day, a brutal deadline, and a peramental computer, all's well that ends well.

e A Friendly User



e ell told that thare comes a time, just ents before tha and, when our entire flash bafore our eyes.

y moment arrived considerebly eer- hope) in the newsroom of e deily paper where I onca toilad. Wa were on deadline—and deedline for a r daily is es immuteble as e brick . I was chasing after the front-page of e gasoline storage tank thet had into flemes helf an hour earlier.

was seeted bafore e computer termi- tied into the newspaper's meinfreme ng and typesetting system. The tala- ne in my right eer was connected to of our reporters on the scana. The hone in my left ear, which snaked nd the computer terminal to another ecross the wey, went to an oil com- spokesman who was in charge of ving as much speculetion, supposi- . and fact as he could.

here were copy aditors hanging over

I WAS hasing after the front- ge story of a gasoline torage tank that had urst into flames half an hour earlier.

shoulder. Behind them e photogra- r wes flashing wat prints that had just n rushad from the darkroom. Across room, the city editor wes weving et me ticelly. "I need it now!" he called. raced through the copy on tha vidao en for ona last pass before sending it off to the aditors and tha waiting presses.

Suddenly the screen imege flickered slightly and the borders of the green type shrank just e frection. Everyone eround me recognized the message immediately: tha computer system was considaring whether to crash, a hebit it had devaloped to an exceedingly fine degree of precision. Our computar nevar seemad to have any problems on Sunday mornings or Naw Year's Day or at other times when we would ell have been perfectly heppy to give it a few hours off. No, our friendly local computer system only went on the fritz on deadline, and then only when the front pege hung in the belenca.

And so, I dove for the Transmit button on the keyboard, the signel to dump the contents of the RAM memory of tha tarminal to one of tha banks of tape and disk drives in the hermeticelly seeled computer room. If one could meke the move quickly enough, the story could usuelly be saved; too slow end it wes back to e blenk screen and e red editor.

Perhaps I should consider it e tribute to our shared reflexes, for I was unexpectedly joined in the mad desh for the Transmit button by two editors and e reporter who were passing by. I think one of us actually hit tha key—it was all such a blur—but I can't be sure, for all of e sudden there were three bodies tripping over the crisscrossed talephone wires.

And than my lifa flashed before my eyes. In whet seemed lika the most exquisite slow motion photography, the video terminal begen to slide off the desk.

We all turnad—in that sama slow motion—to watch, our mouths dropping. The tarminal claared the edge end did a

Illustration **Don** (No Relation) **Day**

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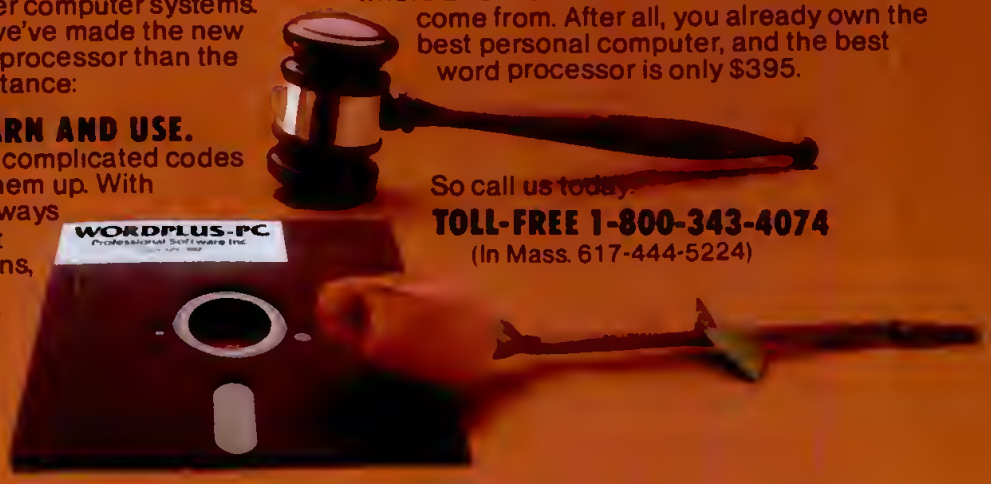

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WordPlus-PC was designed and written by Andres Escallon.

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TWX: 215406 TBYT

CIRCLE 446 ON READER SERVICE CARD

ct helf-geiner towerd the floor.
-one moaned. And then the terminal
within 2 inches of the floor and
ped back up, like some $10,000 yo-
t was saved from e collision by its
black umbilical cord.
ne of us finally recovered enough to
hold of the bouncing terminal and

THE TERMINAL me within 2 inches of he floor and snapped back up, like some $10,000 yo-yo.

t gently beck on the desk.
he screen wes still on, and the mes-
reed: "GASTANK.CDS stored et
5:06 e.m. Next commend?"
y the way, the computer system nev-
id crash thet day.

Goes On

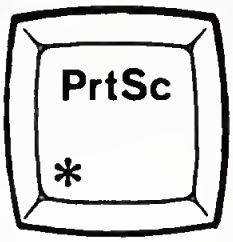
One of the current buzz phrases in the
stry is "user-friendly." In this issue,
take e look et the flip side of that
erative: weys to be friendly to your
puter.
Reguler contributor Winn Rosch offers
ckage of importent stories designed to
keep your baby Blue in the plnk.
'll learn about maintenance proce-
es, power line filters and surge protec-
, the inside story on stetic electricity
the outside line on how to set up your
power compeny if you simply can-
afford a power outage.
Contributing editor Kathleen Burton
cludes her three-part "Anatomy of a
ossus" series, asking the question
hither IBM?"
Word processing users will do well to
ck our article about a trio of utilities
the ubiquitous WordStor before writ-
their checks. You'll also find reviews
he Select word processor for the IBM,
s an eppraisal of a pair of financial
delers, Torget end Microplon.
So, run right out and be nice to your
puter. Next to your copy of PC Mogo-
e, it can be one of your best friends.

—Corey Sondler

IBM PC owners... have your cake and eat it too!

ConvertaBuffer

IT'S A CONVERTER. The print screen functions of your IBM PC require the use of the standard parallel printer adapter. However, the letter quality printing desired for word processing is primarily available from printers with serial interfaces.



ConvertaBuffer enables you to use the print screen key with a serial printer by converting your PC's printer output from its parallel format to a serial format compatible with your Diablo, NEC, or Qume.

IT'S A BUFFER. Letter quality printers are much slower than your PC. ConvertaBuffer accepts data as fast as your PC can send it—1,000 characters per second; stores up to 21 minutes of data in its built-in memory buffer; and then sends it to the printer at the printer's slower speed—10 to 60 characters per second. This allows you to go on to other work without waiting for the printer to finish printing.

21

Easy-to-install ConvertaBuffer comes with built-in cables which plug directly into your PC's printer adapter and your printer's serial interface without removing the cover of the system unit.

IF YOU WANT TO USE ALL OF YOUR PC, GET CONVERTABUFFER.

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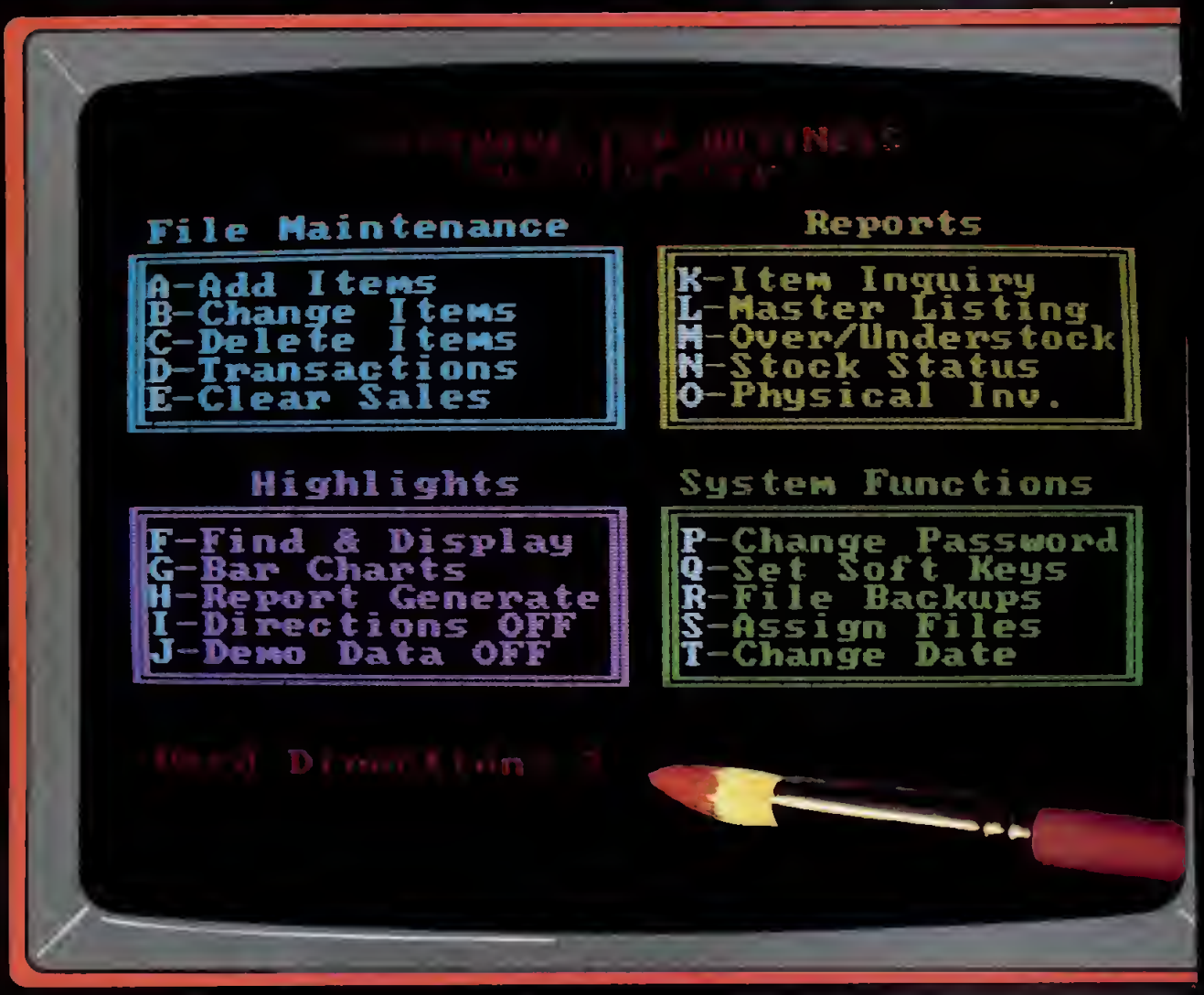

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CIRCLE 166 ON READER SERVICE CARD
CIRCLE 167 ON READER SERVICE CARD

etters to PC

Search of LOGO

articles on educetionel software and nes (Volume 1 Number 8) were espely interesting. However, two items zzled us. In the Table of Contents, the cription of the LOGO article says, eymour Papert's delightfully simple guege, customized for the PC." The cle stetes thet LOGO has been writ- for IBM by Interactive Sciances, Inc.) in Celifornie—but the erticle elso ntions that this organization does not e eny plans for marketing the IBM slon of LOGO. Your description in Table of Contents seems misleeding. It is greet to know that LOGO hes n customized for the PC, but not y helpful to those of us who would interested in ecquiring it if we can't our hands on it! Are there eny other mpenies developing LOGO for the rkat?

Your product reviews are excellent l helpful. Are you plenning to review me finance softwere soon?

Mike and Cathy Hefner
Seline, Kansas

urs wos one of mony letters osking more informotion obout ISI's LOGO. the outhor, Donny Goodmon, stoted, is o nonprofit orgonizotion with no ns to morket its version of LOGO for IBM PC. However, inquiries moy be dressed to Interactive Sciences, Inc., 10 Horriet, Polo Alto, CA 94301.

A commerciol version of LOGO, deloped by Digitol Reseorch, will be oiloble loter this yeor. For more infortion, see "DR. LOGO: A New Stort r Beginners" in this issue.

PC reviewed eight home finonce proams in Volume 1 Number 10.—Ed.

xponential Growth

ul F. Doering of Rochester, New York kes en interesting attempt at erriving the number of PCs sold per year. (Letters, Volume 1 Number 9). We bought our PC on November 1, 1982 from CompuShop in Delles, Serial number

0478744. To follow his thinking, thet would meen 377,032 PCs in 11 months. Assuming even monthly sales end not geometric progression, thet would indicete 411,307 PCs sold during this 12-month period.

Ed Hagen
Oklahoma City, Oklahome

In the "Letters to PC" column in Volume 1 Number 9, Peul Doering chellenged reeders to find e System Unit seriel number higher then 180,000. I purchased my IBM PC on December 31, 1982 from e Computerlend in the Chicago metropoliten aree. The serial number is 231359. According to Mr. Doering's accounting thet makes the total shipment of IBM PCs in 1982 at least 129,647 (231359 less 101712, the seriel number on his PC purchased in October 1981), ignoring, of course, those units shippad in November and December 1981, but who's counting?

The fect of the matter is, the IBM PC hes hed greet market success and is a truly useful tool for business end education. Tha exact number of units shipped is not ell that importent.

Micheel Lang
Western Springs, Illinois

Double Time

Any chance you might switch to bi-weekly publication? My wrists groan every time e new issue of PC arrives. Byte magazine is no trouble since only 25 percent of the copy is really interesting to ma, but PC gats read cover to cover, with each ad getting at least a cursory glance. I know thet mailing costs would double, so going biweakly really isn't a feasible solution, but you folks gotte do somathing or my wrists are gonne go on strike!

Bill Siebert
Spencer, New York

Hove you tried weight lifting? Pleose soy you're kidding obout the bi-weekly schadule. Please?—Ed.

February Fools

I know it's a bit aarly for April Fools, but teke e good look at the picture on pege 388 of Voluma 1 Number 9. The Economic Order Quantity mey provide "what-if" analysis, but how did they menage to run the program with the IBM PC backwerd? Obviously the negetive wes revarsed when printed!

Anywey, keep up the good work. I look forward to reading each issue. Thanks for finally providing reeder service cards.

Petricia A. Leonard
Millbrae, California

The Perimeters of "Parameter"

I enjoy and value PC, and find in it many interesting and useful articles. Generally, your articles heve the virtue of clerity. I am emused end occesionally distressed, however, by the constent misuse of one word.

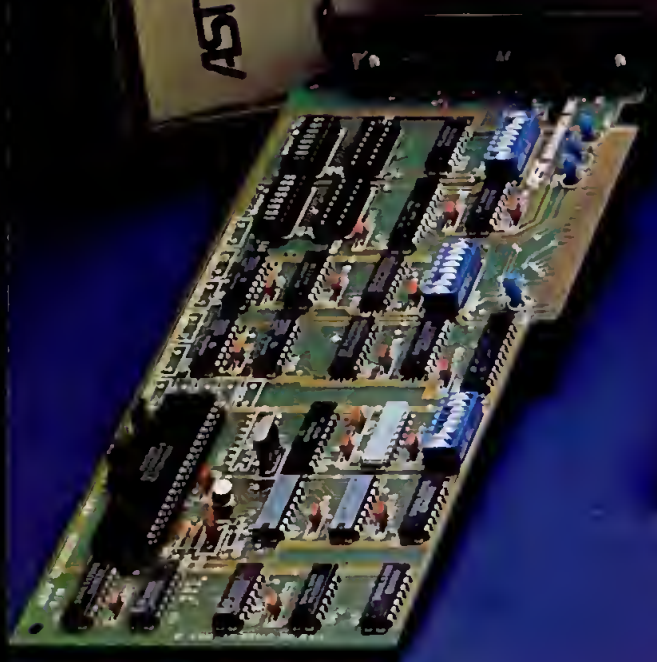
Number One

Communications

Networking P

to be announced
- Multifunction
- Hard Disk Rea
- 1 Mb
- Mainframe P
- Communica

Async



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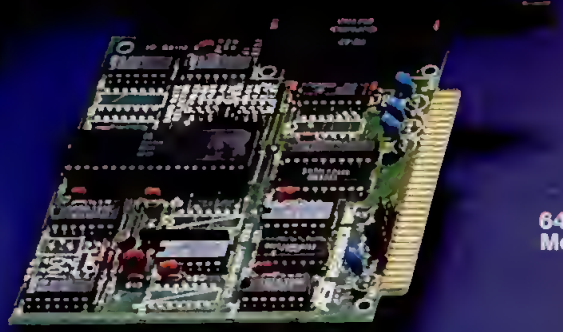

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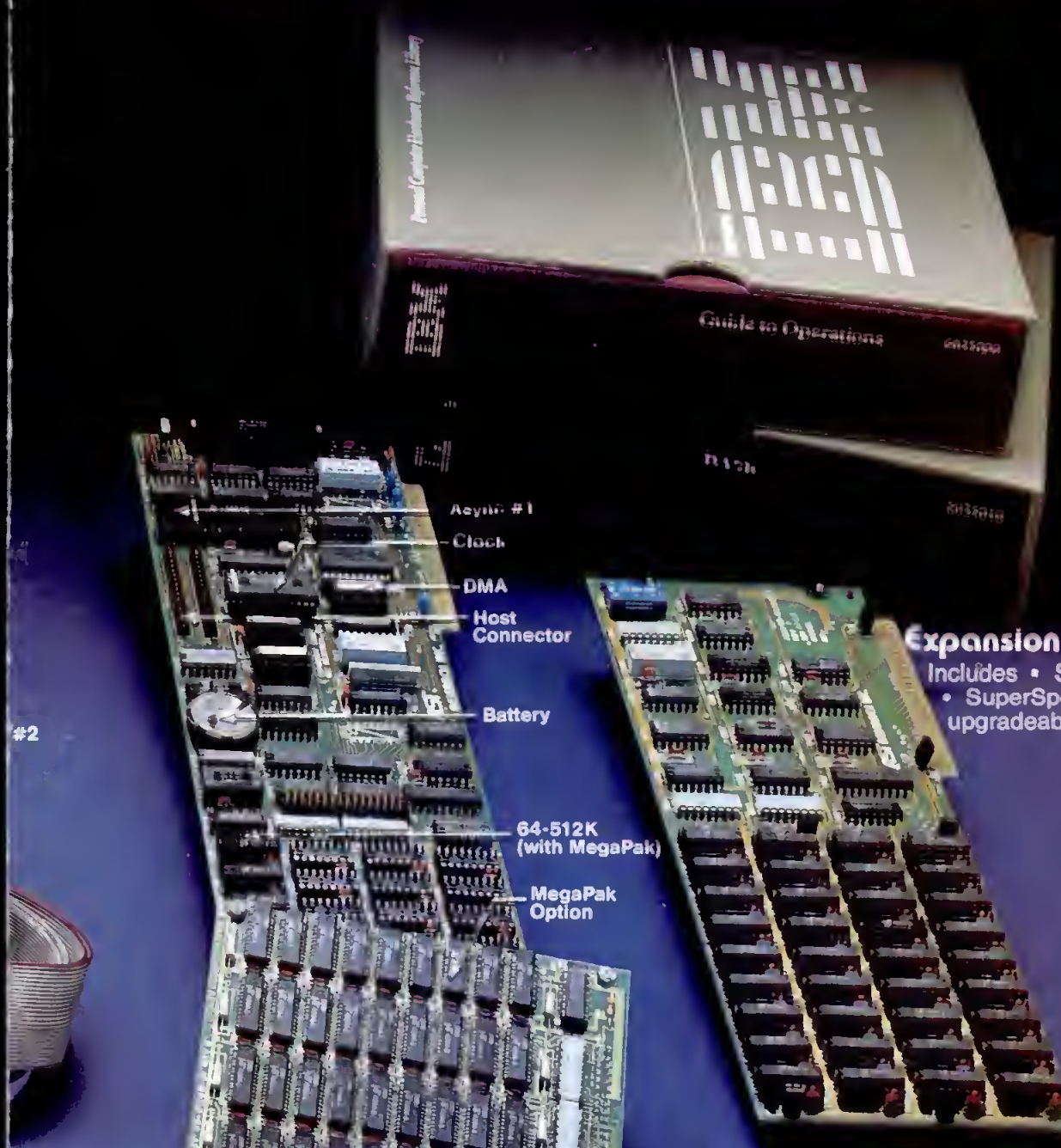
CIRCLE 154 ON READER SERVICE CARD

ts for IBM PC

Other Enhancements



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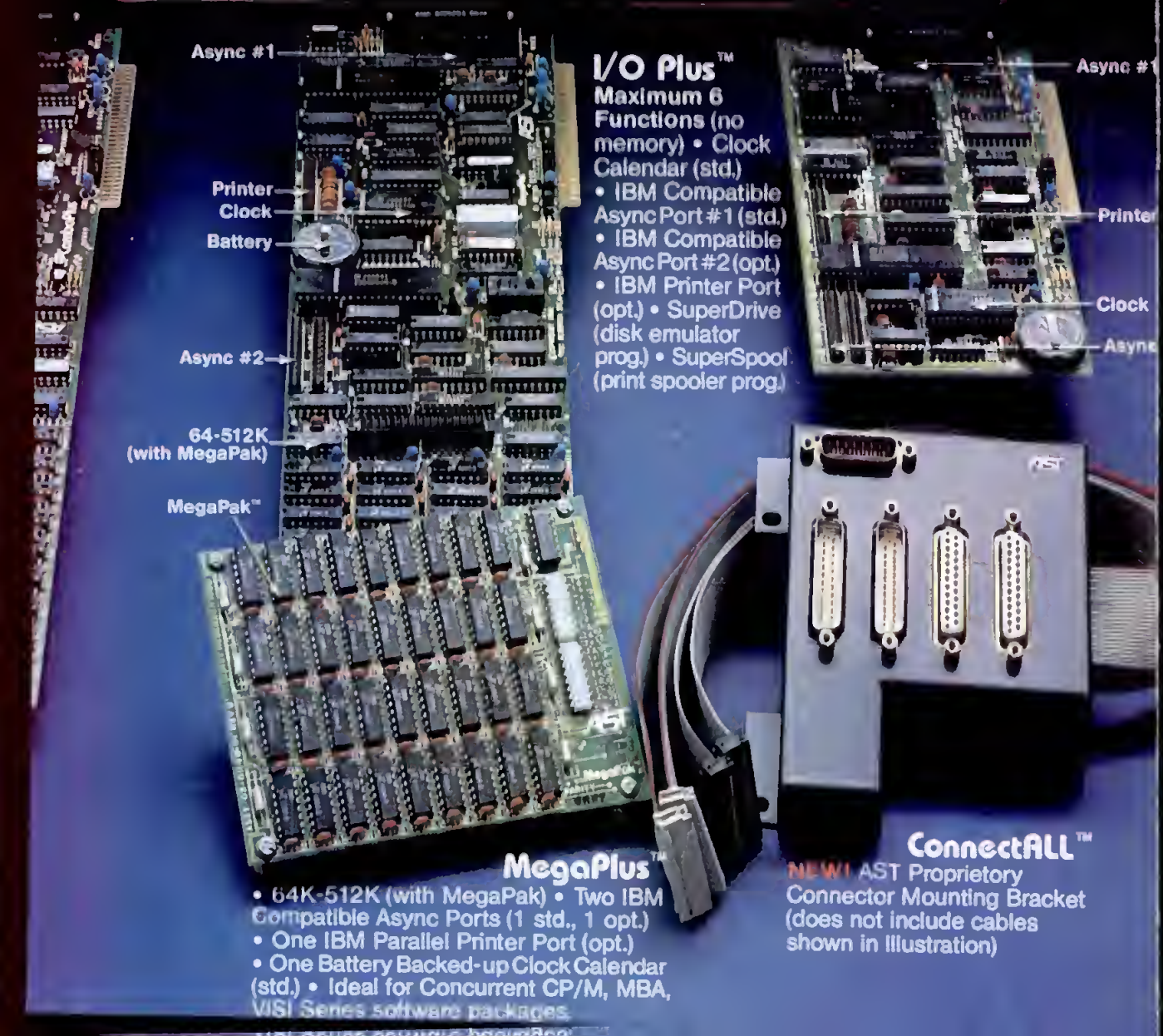

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Letters to PC

You guessed it. The word is porometer. I em not e lenguage purist and heve learned to accept porameter as jargon for perimeter, although this is not et ell what the word means. In PC, however, it has become a wild-card word. I heve seen it used as e synonym for perimeter, as well as definition, specificotion, dimension, feoture. . . .

We all remember Alice saying that when she used e word it meant what she wanted it to mean. We could probably learn to live with her idiosyncracies—provided they were consistent. If you are going to use porometer incorrectly, you should establish consistency in the error. Otherwise you sacrifice the clarity of expression thet I find so much a virtue in PC.

William G. Harrington
Cos Cob, Connecticut

Thonks for your letter. The defense of straightforword English requires constont vigilonce. As it hoppens, the imprecision of parameter hos been the subject of much discussion here lotely. The eighth edition of Webster's New Collegiate Dictionary—widely criticized for its permissiveness, we reolize—offers characteristic, element, ond fector os synonyms for the troublesome paremeter. Still, we ogree with you ond plon to include oppropriote guidelines in our next style revision.

By the woy, it wos Humpty Dumpty, not Alice.—Ed.

Instructions

The article in Volume 1 Number 8 entitled "Educetionel Softwere for the PC" mentioned that The Instructor, e software tutorial introduction program for the IBM PC, had a minor glitch that produces unreadable text if the color version is run on a monochrome screen. This point needs further clerification as it can be a common problem and mey be of general interest to your reeders.

From The Instructor's viewpoint, three screen types ere possible end each requires different program treatment. The three screen types are: 1) the IBM Monochrome, which is connected to the Monochrome Displey/Printer Adapter, 2) a color monitor connected to the Color/Grephics Adepter, and 3) a monochrome monitor connected to the Color/Graphics Adapter. This last type of screen is not an IBM Monochrome, but is menufactured by Zenith, NEC, and others.

Most progrems thet run in vivid color may have a screen presentation problem when run on e system configured es indicated in number 3 ebove. This is because the program outputs color commends to the Color/Grephics Adepter, which then passes these on to the monochrome screen (which cannot displey color). The result is unreadeble text.

The originel version 1.00 of The Instructor did not handle a monochrome monitor connected to the Color/Grephics Adepter, but handled the first two screen types just fine. The current version 1.01 of The Instructor (availeble since November 1982) is designed so the one disk produces reedable text on all three screen types.

Diane M. Dietzler
Vice President, Merketing
Indivlduel Softwere Inc.
Redwood City, California

Uneasy Spelling

PC's guide to word processing programs (Volume 1 Number 7), illustreting the availeble features of 20 word processors, contained an error regarding our corporete neme. It is Norell, not Novell (another firm).

The correct name of the Norell word processing system is Eosyword Processing System. This package consists of the Eosyedit full-screen text editor end the Eosytext format processor. The word processing chert listed Eosytext as th neme of our word processor.

And, while the "spelling checker" box for Eosyword was not marked in word processing chert, Norell Date S tems Corp. does offer a spelling che program. The name of that product i Eosyproof spelling checker.

Melvin L. N
President, Norell Data Systems C

Pagination Problems

Congretuletions on a fine megazine. I think it would be kind to your reade you could number more of the pages, though. The leck of pege numbers makes the Teble of Contents a little herder to use, and the Index to Adver ers much harder to use.

Bob Car
Houston, Te

The problem is thot there ore so many poges, we run out of fingers ond toes t count them on, even when we enlist t oid of our friends in the print shop. We'll try, though. Anyone know of o good computer?—Ed.

Notes and Comments

I certeinly went to edd my "well done to the growing list of satisfied readers PC. It is well-written. In spite of the le ter you received to the contrary, I esp cially eppreciated your unbiased artic on "VisiCalc vs. SuperCalc" (Volume Number 4). It allowed the reader to lo for the feetures he wanted end make t appropriete decision. I feel this is con firmed by the fact that Gene L. Thoma wrote to sey he purchased SuperCalc a result of thet article; I purchesed Vis Colc as a result of the same article.

A welcome eddition to your megazine wes the inclusion of useble programs like "Baking Pi in Your PC" (V ume 1 Number 8). However, you reduced the size of the picture of the act el program to the point that it lost som

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CIRCLE 110 ON READER SERVICE CARD

Letters to PC

of its definition.

Whila I don't expect PC to become the "Nibble" of IBM, it would be nice to have at laast one usabla program included aach month. Whet about somathing on machine or assambly langueges? My local dealer says that the PC is not wallsuited to either. Neither he nor IBM hes providad any help in this aree. Most of my machina languaga experianca goes back to the 6800 chip. I am sure I can get tha 8088 to "jump through tha hoop" if I am given anough of the proper information.

After being so dissatisfiad with the Screen Writer II on the Appla II Plus, I am very careful about salecting a word procassor for tha IBM. I devour each and evary ona of your word-processor product reviews looking for the right one. The FinolWord seems to come as close as anything thus far to what I em looking for. In spite of their contention that it provides true proportionel specing, I saw no such mention in your review. Did I miss it?

Bob Nellans
Argos, Indiana

Mork of the Unicorn, distributors of The FinalWord, do cloim true proportionol spocing with severol printers listed in thot program monuol. This feature wos not testad for our review. We suggest you consult your dealer or Mork of the Unicorn for detoils.—Ed.

Praise for ProKey

Bravo! At last, PC has discovared ProKey!

A yaar ago I purchased my first computer; 4 months leter I purchesed ProKey. If I had it to do ovar, I might reverse the sequence. David Rosa, tha author of ProKey, has dona an axcallant job of providing the new computer owner with a truly usaful tool. This little gem in digits is on every operation disk in my personel file, including WordStor. The expenditure for eddltionel RAM to accommodate ProKey is reasonable et twica tha prica.

Although your reviaw (Voluma 1 Number 9) was vary accurata as to ProKay's features, in my opinion you neglacted to elaborate on its optimum faeture as a Programmer Aida. Whan LOCATE 5,20:PRINT CHR$(186):LOCATE 6,20:PRINT CHR$ (186) can be replaced with a two-kaystroka antry, programming can becoma truly fun even for us new computer owners.

Keep up the good work and daliver additional gems such as ProKey to your staff for reviaw.

Gena Preeca
Renton, Washington

Keyboard Katastrophes

Criticism of tha IBM keyboard layout is interesting but misses one of the main problems—its fragility. Three of the four PC owners that I know have serious problems with their keyboards aftar lass than one year of operation. One has no X-kay function. Mine sometimes gives out random aven numbers when my hands approach tha top row of keys. Another has suffered a massive failure, ganarating 301 codes (that is, 01 or 03 or 05 or 07-301) after baing attached to my machina. All three systems were purchasad in tha U.S. (California and Naw Hampshire) from eight months to a year ago and have been used mostly for word processing, program development and communicetion purposas. Are othar usas simlarly afflictad? Should thare ba an auto-industry type recall of these shoddy products?

R.J. Rahn
Sta-Foy, Quabec

We don't know if this is just a run of back luck or something more significont. We know of three keyboards in our office thot receive very heovy doily use with no reports of problems. Readers?—Ed.

With all tha compleining about the P kayboard (shift kay placamant, combined cursor and numaric kays, etc.) why hasn't a peripharal manufacture come up with an altarnata kayboard? Tha standard PC keyboard is $270; s ly a replacement could be marketed about that price. IBM could do its pa and sell systams without a kayboard, admit thay ware wrong and redesign thamsalves.

And for those who would prefer t meke do with some minor improvemants, how about a modification kit axisting keyboards (reduca the size o the + kay, move tha integer-divida k to tha lower right cornar, and increas tha size of tha laft shift kay so it bord the z key).

With raspect to the magazine, I am sure many people who weren't on bo from the beginning would want to co pleta thair sets with Issuas 1 and 2, which are now out of print. PC shoul reprint a combined spacial edition!

David Horow
Yardley, Pennsylva

For informotion on on olternotive keyboard for the PC, see "Key Tronic's S Touch," page 347, Volume 1 Number 9.—Ed.

PC is Catchy

I recently acquirad a PC in my offica and I am just getting used to it after many yeers on mainframes. I still do much of my work on meinframas and is both challanging and exciting to int grate all the resources at my disposal. actually access saveral mainframas an hava accass to savaral tarminals includ ing a naw graphics terminal and plotter.)

The major problam I have is people in the office coming in just to look at the equipment and see what I am doin Now anothar office would like to get a microcomputer and, since the staffers there trust my judgmant, thay would

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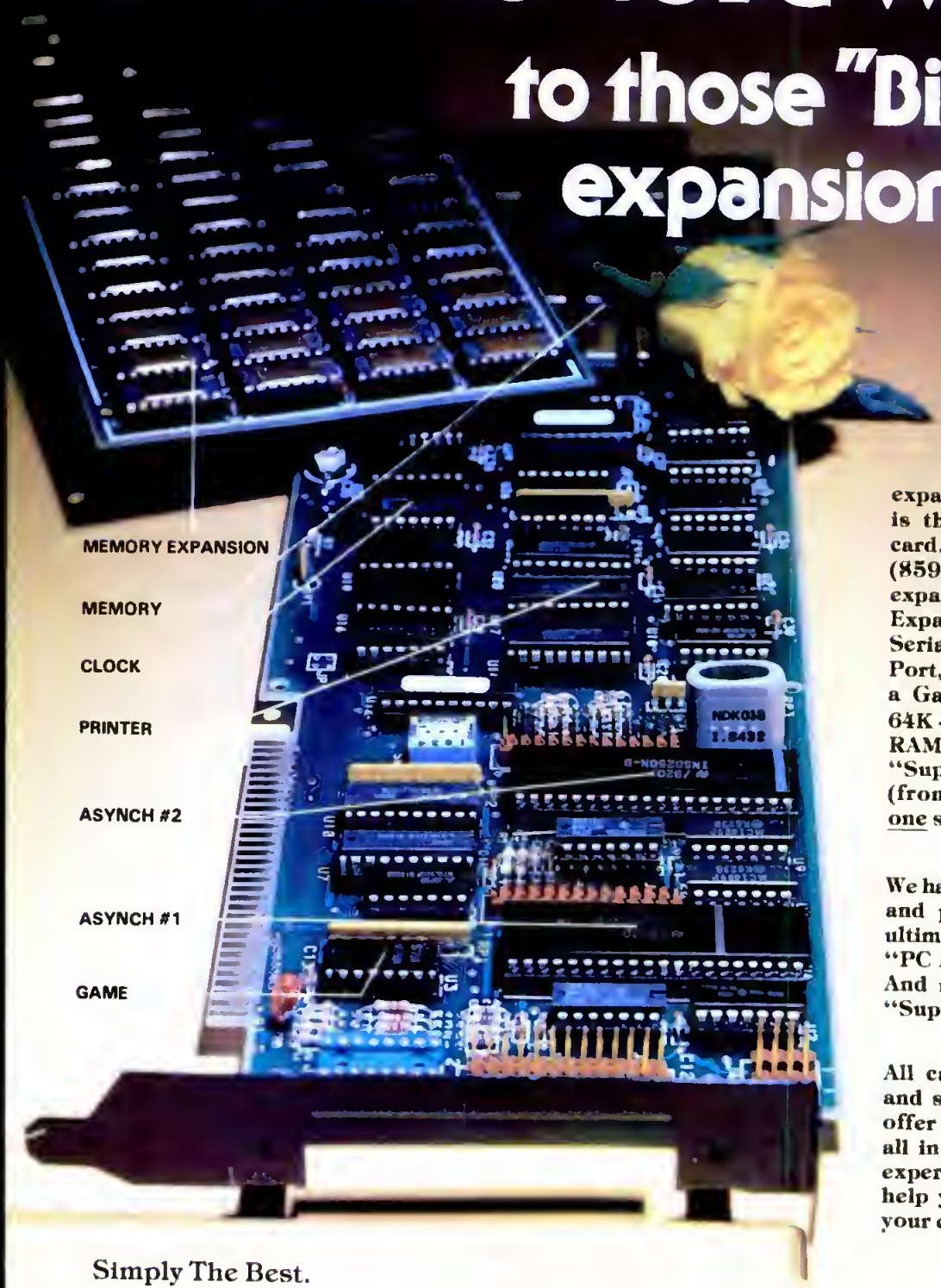

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CIRCLE 222 ON READER SERVICE CARD

Letters to PC

lika to acquire a PC. Howevar, a substantiel portion of their computer work has been dona in APL. I know that APL-80 is available, but is there an APL available for the IBM PC? If you or your readers are aware of one I would greatly appreciata laarning about it. If I hed tha time I might try creating ona using my C compiler.

John W. Broderick
Springfiald, Virginia

You ore correct—APL hes orrived, ond for the PC, too. See "Programming With Funny Symbols" ond "PC APLicotion" In this issue—Ed.

Bothersome Bifocals

Almost every illustration in *PC* shows tha monitor sitting on top of the disk drive, which sits on a desk top 30 inchas high. The furniture manufacturers advertising in *PC* show the monitors evan highar. Don't any of the designars weer bifocal glesses? I know computers are for young people, but evan those kids growing up on computers now will wear bifocals someday.

In my opinion, the monitor should be designed to accommodeta by placing the disk drive on top for us old duffers.

D.G. Jadala
University of Illinois
Urbana, Illinois

We sympothize. Those of us who wear contoct lenses would oppreciote o little less glore, too. You might look into on occessory keyboord extension coble thot would ollow you to ploce your computer off to the side ond hove your keyboard directly in front of the lowered monitor.—Ed.

Vendor Validity

I read with interest your review of tha Crosstolk communications system (Volume 1 Number 9). I would like to relete my experiance with Crosstolk to you and your readars.

I hava had experiance with a numbar of communication packages. My particular neads ere somewhat unique since I upload/download APL programs. The APL language uses special characters as operators that are formad by "overstriking" two charactars. For instance, the "fectorial" oparator is formad by typing single quote-backspaca-pariod (prints as !); another operator is slesh-backspace-minus (≠). Few communication packeges allow the backspace cheracter to be treated as text. Rather, it is filtered out or traated as a control charactar (usually "erase"). ST-80, the defacto standard communication packaga on TRS-80 computers, contains a utility that allows specification of tha disposition and substitution of any control charactars the user desires. I hava not seen any othar packages allowing this, including Crosstolk.

Since Crosstolk filtered out my neaded backspacas, I placad a call to Microstuf. I spoka to someona who listenad to my problem and promised to call back with e solution. Sure enough, ha did. Over the phone, ha dictated step by step what to do as I keyed his instructions into Debug on my PC. It took only a faw minutes and when he finished, Crosstolk downloaded APL overstrikes exactly as I needed.

I am vary satisfied with the packaga. The documentation is excellent and evarything works. It even ellows me to pass data betwaan my PC and TRS-80 running ST-80. I find tha command moda structure (as opposed to menu driven) convaniant, aspecially with e smell reference card I mada for it sitting on top of the keyboerd. The only shortcoming I found was that a download to memory must fit into ona sagmant, limiting the volume to 26K. I was informad, however, that the next releese, due out soon, will not hava this restriction.

By fer the best feeture of Crosstolk is the way Microstuf stands behind the product. I have read many lattars in your magazina from usars complain that tha vendor was unwilling to he them with thair problams. Unfortun ly that seems to be prevalant in tha dustry. Perhaps idantifying tha supp ive and non-supportive vendors for ars whanever possible will help to i prove tha industry.

George F. W
Red Bank, New Je

Friendlier Ware

All of us hara at FriandlySoft were v plaased to see Arlane Barlin's review our Friendlyware PC Introductory Se "The Best Little Programs in Texas" (Voluma 1 Number 8).

I was more than a little shockad, howaver, whan I read, "The only dis pointment with this package is that there is no warranty if the programs prove defective. Tha risk is entirely t user's." As any of our customers who had problems can attest, this is simpl not the case at all.

In fact, I wouldn't hesitate to say t FriendlySoft has one of the best supp programs in the industry, and it will come even battar very soon. Wa curre ly maintain a 24-hour Hotline that is swered by programmers or manageme parsonnel — rether then just a voice that takas numbers. Should a custome heve a problam that cannot be handla over the phone, we'll send e free replacemant or correction within 48 hou of receipt of the defectiva product.

In eddition, we will soon introduce tha most axtensiva product support pr gram in existanca: Tha Friendlyware "No Fine Print" Lifetima Guarantee o our Mastar Diskettes. I suspect that thasa policias will raise more than a fe eyebrows. They axemplify our commit mant to tha vary best product support possibla. Wa will also ba eliminating a major customer problem, formetting an transfarring systam and languaga to back-up disks, by handling these proce

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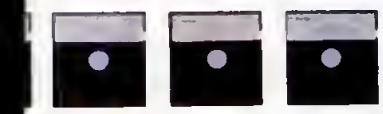

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- Fully buffered, with full 1920-character screen page on-board
- Comes with 3278-2 terminal emulator program
- Interfaces to custom programs through I/O commands
- BASICA subroutines supplied to facilitate access to screen buffer and keystroke generation by custom programs
- Off-line selfchecking diagnostics

You'll find IRMA's specifications in the box above. Write for more information to TAC, 120 West Wieuca Road N.E., Atlanta, Georgia 30042 or phone (800) 241-IRMA. Other personal computer owners, don't despair. IRMA has sisters who are on the way.

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etters to PC

s eutometically in the future.
hope this letter will help to clarify
policies and objectives in the area of
omer end product support, and I
k you for the otherwise very posi-
and eccurate review.

James J. Devis
President
FriandlySoft, Inc.
Arlington, Texas

st for the Bucks

umber of letters and articles in PC
a axpressed an urgent need to ac-
re lerger disk capacities. Some own-
of early units with single-sided disks
upset that the conversion to double-
ed disks is so expensive. Other au-
rs ere convinced that e system leck-
Winchester support is inadequate.
My PC wes delivered a yaar ego. My
mediate reaction was to dasire more
k capaclty. I have a different view
w that *I* heve ecquired a half-meg
mory for my PC. This memory was
atively inexpensive, end current ads
present aven lower costs than I in-
rred (on tha order of $500+ for
2KB). *I* spent e weekend writing and
bugging virtual disk support and a
nt spooler based on this edditional
mory capacity, and my storage prob-
ms evaporated. *I* get better perfor-
ance than any Winchestar disk can of-
, and having four disk addressas of-
s great flexibility in juggling utility
es. Rarely do I encounter a storage
lume problem.

Considering the power end perfor-
ance of this option, and its cost, I am
solutely convinced thet it represents
e best "bang-for-the-buck" that could
ssibly be edded to the PC. I no longer
ally need a hard disk, though *I* recog-
ze thet I might if I were to go into ed-
nced database applications. For mun-
ne edits, compilations, etc., this lerge
emory capaclty is all that anyone
could esk for. *It* actually outperforms a hard disk!

David F. McManigal
Stormville, New York

Flight Failure

First-time contributor Will Fastie has already performed e greet disservice to PC readers. Nowhere in his gushy review of Microsoft's Flight Simulotor (Volume 1 Number 9) does he aven alluda to that which is so claarly stated on page 4 of tha program's manual: that tha flight simulator will only produce black and white on RGB monitors.

I have no doubts that Mr. Fastia would heve waxad a bit less ecstatic had he flown ovar grey land, glided ebove greyer water, soared through light grey sky, end executed a three-pointar on e grey airstrip. The whole experience is like flying out of LAX when the fog's in.

A review of a software product in your megazine should be just that. *It* should cover the better points of a program along with its limitations. Fastia's "my most unforgettable character" approach masquarading as a sarious softwere review is unconsclonable.

As penence, *I* think PC owes those readers who on its recommendation purchased the flight simulator, only to be disappointed and misled, some sort of article on radio frequency modulators end home TVs: what works with what. As my contribution to your initial research on this articla, the Sup'R Mod markated by IBM fails with a Zanith System 3.

Trevor Thomas
New York, New York

Will Festia replies:
Touché. I did not hove o chonce to try the product on on RGB monitor. No excuse, of course, but the truth. *I* wos told by Microsoft obout the block ond white disploy, but since I did most of my testing on o block and white TV, ond since the disploy there wos very sotisfoctory (especiolly with o cloud loyer), I never thought block and whita per se wos o problem. I hove since seen the program running on on RGB device, ond I ogree with Mr. Thomos' remorks.

Nonetheless, *I* stond by my unquolified recommendotion of the product. It is truly on omazing program, and on excellent simulotion. If you ore interested in flying, you ore not going to be disoppointed. You certoinly will enjoy the product more if you use o composite monitor or TV. And os for my style, well, why not be entertoined by o review of on entertoinment product?

Dunce Cap

We are honored to be included in your erticle "The PC Goes to School" (Voluma 1 Number 8), and write only to offer the minor correction that Saint Andrew's School is affilieted with the Episcopal Church.

In pessing, may I note thet you produce en ettractive, articulate, and highly useful magazine.

John P. Cotton
Heedmaster
Saint Andrew's School
Boca Raton, Florida

Correction

Dua to an aditing arror, PC omittad tha eddress for E-Moil, en electronic mail facility discussed in "The Electronic Ravolution" (Voluma 1 Number 9). For more information about E-Moil, write to: Jones Engineering Associates, Inc., P.O. Box 26134, Charlotte, NC 28213, (704) 455-9616.

PC welcomes letters from readers. Write to: Letters, PC, One Pork Ave., New York, NY 10016. Letters published moy be edited.

The New Sofstar™ Peachtree™ Connection bridges the gap between your general ledger and spreadsheet program. And then some.

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Peachtree Connection will also transfer your accounting data to Sofstar's new Business Planning Tool.

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So, if you want to free your accounting data to work in powerful new ways for your business, Sofstar's Peachtree Connection is the solution.

See for yourself. Visit your nearest computer store for a demonstration of Peachtree Connection today. Or contact us at: Sofstar, Inc., 13935 U.S. #1 Juno Square, Juno Beach, Florida 33408, (305) 627-5511.

Suggested retail price is $95.00.
For use with IBM PC.

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VisiCalc is a registered trademark of VisiCorp.
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ARE YOU STILL LETTING YOUR PRINTER TIE UP YOUR COMPUTER?

While your printer is running, your computer is tied up. You can't use it for processing, computing, data entry. Nothing. All you *can* do is twiddle your thumbs until the program is finished.

Pretty ridiculous.

MICROBUFFER™ ALLOWS YOU TO PRINT AND PROCESS SIMULTANEOUSLY.

You just dump your printing data directly to Microbuffer, whoosh!, and continue processing. No waiting.

Microbuffer accepts data as fast as your computer can send it. It stores the data in its own memory buffer then takes control of your printer.

It's that easy.

THERE IS A MICROBUFFER ESPECIALLY FOR YOUR IBM.

Microbuffer In-line (just one in the full

line of Microbuffers) is a stand-alone printer buffer available in both parallel and serial versions. Its front panel features three touch sensor controls: one to clear the buffer, a pause button to halt printing and allow data to pass around the buffer (for log-on and other tasks), and a copy button to reproduce the last document up to 256 times without any computer intervention. The serial stand-alone will support different input and output baud rates and three handshake modes.

The 32K Microbuffer in-line starts at $299, $349 for 64K, and 64K add-ons (for a total of up to 256K) are just $179. The Microbuffer requires no user modification of software — it installs easily, in seconds.

Other Microbuffer models include Microbuffer II for Apple II computers and Microbuffer/E for Epson printers.

MICROBUFFER FROM PRACTICAL PERIPHERALS.

So what are you waiting for? Write to us for more information or ask your dealer for a demonstration.

When you see how much freedom Microbuffer will allow, you'll understand why it's so silly to be without one.

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(213) 991-8200

MICROBUFFER FREES COMPUTERS.

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If you think you need to spend $700 for a good data base management system, don't let our $225 price tag stop you.

Surely we can put the extra $475 to good use.

Undoubtedly you can, too. Data Design™ is a full-feature, relational data base management system (DBMS) for people who value their time as well as their money. Written expressly for the IBM Personal Computer, Data Design takes advantage of the special function and editing keys so you spend your time working, not learning.

Waiting for a sort could put you out of sorts.

Data Design's unique internal structure means you retrieve data instantly without ever waiting for a sort. Print an alphabetical address list and then zip-sorted mailing labels with no delay.

Data Design even lets you enter and print information on forms you design to look just like the ones you use everyday—with all calculations done automatically.

While other DBMS users are getting sorted out, you can be getting results in just the formats you need.

It helps to memorize one key word:

Press F1 whenever you need help and you'll be greeted by a tutorial that addresses whatever you're working on *at that moment!* While users of other popular DBMSs are still memorizing program commands, you'll be sped along your way by menus and comprehensive help screens.

In one disk and out the other.

Data Design is the only major DBMS that allows telephone transfer between any two Personal Computers, so you can communicate instantly and accurately across the street or across the country.

Data Design also lets you make those all-important back-up copies without leaving the friendly menu-driven environment you've come to know and love. In the event of a power failure, it rebuilds the data base you were working on.

Our manual is so easy to understand we've also released it as a book. If you want to learn more about data base management in general and Data Design in particular, ask for *Data Base Management Made Easy* at your local book or computer store. At $16.95, it's almost as good a bargain as Data Design itself.

Easier done than said.

Making a data base management system easy for non-programmers made it harder for us, but we think you'd rather use a language you already know than learn another. Since explaining it takes longer than using it, we'd like you to try it at our expense. Send us $225 (or $700, if you insist) and we'll send you Data Design. If, during the first 30 days, you decide you can manage without it, we'll refund your money. Without our software, we think you'll need it.

We put a high price tag on your time, not on our software. To find out more, call us at 503/244-4181 or stop by your local computer store.

Data Design works with a 128K IBM PC with double-sided drives and supports hard disks.

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ST LOOK/COREY SANDLER

a flurry of activity, IBM announces a family new products and price cuts on a host of iliar ones.

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ntroducing The PC-XT And Company

it the PC "One-end-e-helf." IBM ped e shoe in New York City in early h, when it announced the Personei puter XT, an enhanced version of the at includes e 10-megabyte herd disk, expansion slots, end e new mother- d with extre memory. Also an- ced were a high-resolution color itor and e set of expension chessis for the PC-XT and the originel PC. The hard disk system can also be used the PC.

o drive the new peripherels and oth- evices, IBM released DOS 2.0 end IC 2.0, which do not replece the 1.1 ions but are designed to be inter- geeble. According to IBM, the new vili run eny software thet operates on PC. Programs written expressly to advantege of the new DOS 2.0, how- , may work only on the XT. A full ew of DOS 2.0 will eppear in the next e of PC. A new word processor end a set of eccounting programs were elso ounced.

And in an aggressive move to sew up n more of the personel computer mar- IBM lowered the price of much of the sent PC line of computers and hard- e. A basic PC system with 64K of M, a keyboard, end one single-sided drive will list for $1,864, down 15 cent from the previous price of $2,205. iler price reductions were made ughout the product line.

This wes not the shoe everyone was ecting to fall. There was no mention of "Peenut," the "Popcorn," the PC-2, or of the other products thet were the subjects of verious rumor mills through the fall and winter of 1982-83.

The IBM PC-XT in its basic configuration. From the outside, it looks like its forbeor, except for the lock of o slot on the hord disk ond o demure "XT" on the silver IBM nome plote.

IBM did ennounce en upgrade to its popuiar business displey terminai, the 3278, which enabies users to elternate their PCs between communicetion with a mainframe end desktop computing. With the 3278, data can be readily exchanged between the PC and the meinframe system. This upgrade, observers seid, mey greatly increese IBM's desktop computing presence among esteblished accounts.

In e glimpse into whet mey be the future of displey units, IBM elso unveiled its long-ewaited flat screen ges piesme displey terminel. The IBM 3290 information penel can displey more than 10,000 characters of deta in a wide variety of formets on en amber screen that measures 10.7- by 13-inches. The viewing aree can be divided into quadrants to provide eccess to four different applications—in effect, ellowing the device to function as four separate concurrent terminels. No plans were announced to link the plasme displey directly to e PC, although an IBM spokesman refused to rule out any possibility. The new display will sell for $7,100.

The PC-XT bese system, priced at $4,995 et IBM Product Centers, features 128K of RAM, which can be increased to 256K on the motherboard without using

IBM's 3290 flat screen gas plasma infarmatian panel may be the harbinger af things to come. The screen can display nearly 10,000 characters and can alsa be divided inta as many as faur separate wark areas, each af which can be processed concurrently. Na plans far immediate adaptatian ta the PC were announced.

An IBM representative demanstrates the PC-XT and the new Peachtext word pracessar far PC editar Corey Sandler.

sn expansion cerd. The centrel processing unit (CPU) remains the Intel 8088. The bese system also includes a 10-megabyte fixed hsrd disk drive, s double-sided floppy disk drive, end an esynchronous communicetions edapter. The new XT includes eight expension slots, elthough one is given over to the asynchronous board, one to the herd disk controller, and one to the floppy disk controller. Three of the eight slots are shorter then the slots on the PC, and all the slots are slightly closer together.

With an optional expansion unit instelled end with meximum memory, the XT end the PC can store neerly 22 million cherecters of informetion, the equivelent of 11,000 double-spaced typewritten psges.

DOS 2.0, which will sell for $60, ellows use of standerd IBM double-sided disk drives with e 360K formet, en increese of slightly more then 10 percent in storege. The operating system—slightly longer than the DOS 1.1 files—will support one or more disk drives or fixed disks. File space can be allocated dynemically as deta is added. Directories are "tree-structured"; subdirectories within directories allow quick, logical organization of informetion from the lerge-ca ty herd disk.

Other features of DOS 2.0 include port for "job streem" sequencing of grams es batch files end support of c tionel logic, e grephics screen dun the printer, redirected input/output example, keyboard input end direct

THE PC-XT can be increased to 256K on the motherboard withou using an expansion card.

put to e file), piping (output from prog "A" used as input to progrem "B,") e background file print utility thet per simulteneous file printing with o ectivity.

The IBM color displey feetures e 1 inch screen cepeble of displeying cherecters in 16 colors egeinst on eight background colors. The mon is housed in en enclosure simila that of the monochrome displey u with the addition of an on/off swit

PeochText, e new word process peckege for the PC end PC-XT, reteil for $400. It will be sold alongs IBM's EosyWriter. Also from Peecht Softwere is en upgreded set of busin softwere peckeges for Generel Led Accounts Receivoble, Accounts P oble, Inventory Control, end Poyr Users who already have versions 1.0 the Peechtree Accounting System upgrede eech progrem to version through euthorized IBM deelers e cost of $120 for eech progrem.

The XT will be produced et IBM menufecturing fecility in Boca Ret Floride. In June, the new model will eveileble in Europe and the Mid Eest. It will errive in the Far East Mey, the company seid.

Next month, PC will include full deta on the new IBM product announcemen together with honds-on reviews and an yses.

This Programming professional deserves a lot more from his personal computer.

e's earned it. As a seasoned professional, e's learned to master some of the world's ost advanced programming tools. Tools ecially designed to meet the everyday emands of programming experts.

But as the owner of a personal com- uter, he's come to expect less. Less erformance. Less sophistication. And less lexihility.

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Prior to the announcement of micro/ PF™ development software, experienced rogrammers felt programming a personal omputer was a lot like playing with a toy. ou couldn't take it seriously.

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With micro/SPF™ you get the same procedures and commands experienced programmers are accustomed to using at work. By mimicking features found in standard SPF software, micro/SPF™ provides all the sophisticated utilities programming professionals expect.

Programming experts can take advantage of skills they've spent years perfecting.

Now, for the first time, mainframe software is availahle for personal computers. SPF screens are fully reproduced in logical sequence and each screen is formatted identical to those found in the SPF system.

In addition, micro/SPF™ comes equipped with the same primary and line commands, tutorial messages and program editor (with program function keys) experienced programmers are used to.

Programming professionals who've spent years perfecting the art of writing sophisticated code deserve to work with state-of-the-art tools, not toys. Find out how micro/SPF™ can help you do work-compatible programming on your personal computer today!

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Before you buy a multi-function RAM board for your IBM™ PC — here's what yo need to know about ANATRON's "answerRAM"...

it gives your PC professional system expandability

The answer for business and professional users

Now, there's a high quality expansion board for your IBM PC that combines:

- up to 256K of additional RAM
- 3 complete I/O ports, fully compatible with your IBM
- the best communications interface you can buy

. . . "answerRAM" from ANATRON.

Memory and more — the most complete board yet

Most PC owners buy a multi-function RAM board for two reasons: for additional main memory, and to get additional Input/Output (I/O) ports without using up precious expansion slots on the IBM PC's motherboard.

Like all quality RAM boards, "answerRAM" gives you RAM expansion in 64K increments up to 256K, with pa ity checking, fully compatible with your IBM PC.

But beyond that, "answerRAM" is also the most comprehensive I/O board available — with two serial communications ports and one parallel printer port, fully wired — read to go. Best of all — memory and all three I/O ports use only one slot!

ANATRON

Anatron, Inc.
202 West Bennett Street
Saline, Michigan 48176
1-800-521-0521

·erRAM" lets your ı grow

"answerRAM's" I/O capability .n connect your PC simul- ısly to a letter quality printer, a peed printer, and a data service al area network. Now, you can e most appropriate printer for b — without fussing to change : or wasting your time. Or, you :cess a data service or download rom your company frame computer, ut discon- ıg your er.

ıy buy a board that will limit fu- :xpansion, when "answerRAM" the same as less functional ıs?

. "answerRAM" you get the most f one expansion slot — saving 's for future enhancements — so system can grow as your needs .

best communications 'ace — hands down

a close look at what is required e the available I/O ports offered :her multi-function RAM boards. ɔnly are there fewer ports than verRAM" provides, but nearly all ire you to modify the board, add ıectors or use up additional slots ilize all their I/O ports.

'werRAM" is designed for busi- users who need a professional :ion. All I/O ports connect ıgh a single, heavy-duty 37-pin ıector, rigidly mounted in the dard rear slot of your IBM PC — like it belonged there. No flimsy ɔn cables snaking around the sis. We've even made a unique, ·y-duty, shielded, "3-into-1" cable ttaching all peripherals.

ɔlutely no clock — here's why

ike other boards, "answerRAM" does not include a board-mounted clock — by design. Your PC has an internal clock/calendar. True, it needs to be initialized each time the system is started, but board-mounted clocks that try to save you that trouble create new problems instead:

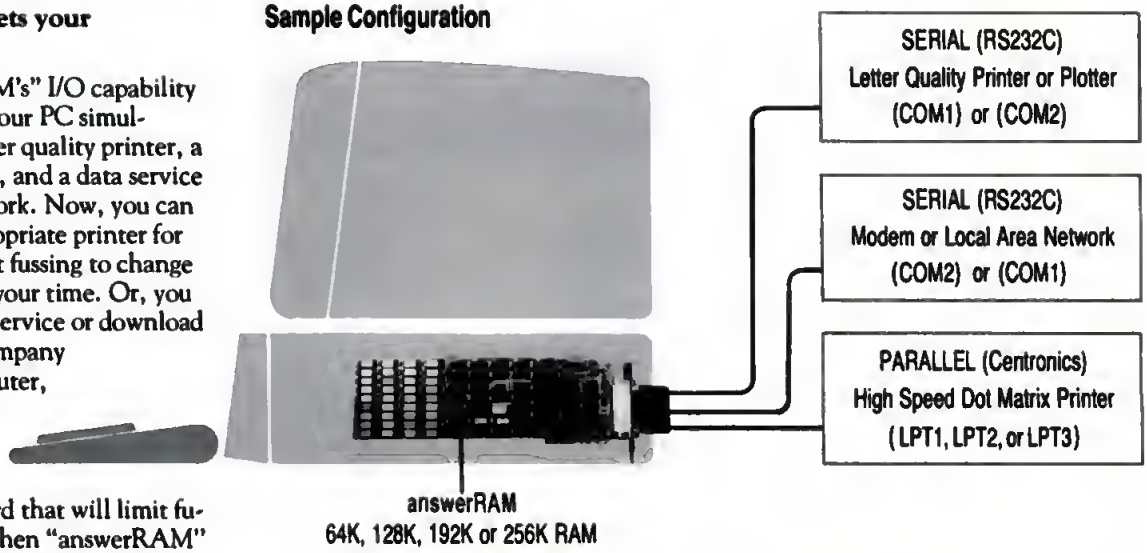
- they use address space that may conflict with future enhancements
- they must be disabled if your PC clock is to be synched with a network clock
- you must carry the clock software on all your system disks

We put our clock on our disk-controller board where it belongs.

Software to process faster, print more conveniently

"answerRAM" comes complete with software to make your additional RAM function like an electronic disk or as a print spooler. And we've included a nifty piece of software that lets you toggle the system's default printer port from one port to another with just a keystroke.

Sample Configuration



Comparison Chart

	2 Serial ports standard	1 Parallel port standard	I/O ports "ready-to-go"*	Electronic Disk	Print Spooler	Default Printer Toggle	Clock Calendar	Mfg. supplied cable/connectors**	Uses only 1 slot for all communications
ANATRON "answerRAM"*	●	●	●	●	●	●		●	●
AST ComboPlus*		●		●	●		●		
QUADRAM Quadboard*		●		●			●		
SEATTLE RAM+*				●					NA
TECMAR ALLinONE*		●		●	●		●		

*all I/O ports factory-wired to all necessary connectors — no user modification required
**manufacturer's own cable available for interface to peripherals

Specifications:

Memory: 64K, 128K, 192K, or 256K with parity, just as IBM installed

I/O: 2 Asynchronous Serial ports
Configured as COM1 and COM2
Programmable, for 50-9600 baud, 1, 1.5, or 2 stop bit generation, even, odd or no bit parity, 5, 6, 7, or 8 bit character communication
1 Parallel Printer port
Configured as LPT1, LPT2, or LPT3
All ports can be disabled

Cable/Connectors: 37-pin commercial grade connector and support bracket mounts in chassis
"3-into-1" heavy duty cable with 37-pin connector
2 each DB25 (RS232C) connectors
1 each "Centronics" connector
Cable is jacketed and shielded

Manual: Illustrated 26 page manual in IBM PC owner's manual format

Warranty: One (1) full year on all parts and labor (second year extended warranty available)

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answerRAM is a registered trademark of Anatron, Inc.
ComboPlus is a registered trademark of AST Research, Inc.
Quadboard is a registered trademark of Quadram Corporation.
RAM+ is a registered trademark of Seattle Computer
ALLinONE is a registered trademark of Tecmar Inc.

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SOFTWARE for the IBM-PC

BUSINESS

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dBase II, requires CP/M $4 & 128K		$ 700	$445
dBase II, requires PC DOS & 128K		$ 700	$445
APPLIED SOFTWARE TECHNOLOGY, Versaform	NEW!	$ 389	$265
DATAMOST, Real Estate Investment Program	NEW!	$ 130	$ 89
Write-Dn		$ 130	$ 89
EAGLE SOFTWARE, Money Decisions	NEW!	$ 150	$129
HOWARDSOFT, Real Estate Analyzer II		$ 250	$189
INFORMATION UNLIMITED, Easywriter II (a WPS)		$ 350	$259
Easyspeller (80K Words)		$ 175	$129
Easyindex (a DBMS)		$ 400	$299
INNOVATIVE SOFTWARE, T I M III (a DBMS)		$ 499	$345
★ IRSOFT, Data Design (a powerful easy to use DBMS)	NEW!	$ 225	$155
ISM, MatteoMagic		$ 90	$ 69
LOTUS, 1 2 3		$ 495	$329
★ MICROCRAFT, Requires CP/M 86			
Legal Billing & Time Keeping — Verdict		$ 750	$299
Professional Billing & Time Keeping — Billkeeper		$ 750	$299
★ MICRO LAB, The Tax Manager		$ 250	$149
★ MICROPRO, WordStar® plus free WordStar Training Manual		$ 495	$245
MailMerge™		$ 250	Call
SpellStar™		$ 250	Call
3 Pak, Word & Mail & Spell, above 3		$ 845	Call
InfoStar	NEW!	$ 495	$235
ReportStar	NEW!	$ 350	$235
MICROSOFT, Flight Simulator (by SubLogic)	NEW!	$ 50	$ 35
NORTH AMERICAN RUG SYSTEM, The Answer		$ 250	$185
PBL CORPORATION, Personal Investor	NEW!	$ 145	$ 99
★ PEACHTREE, Peach Pak 4 (GL AR & AP)		$ 595	$295
PERFECT SOFTWARE, Perfect Writer™		$ 389	$229
Perfect Speller™		$ 189	$129
SELECT INFO, Select (a WPS)		$ 595	$239
SORCIM/IUSA, SuperCalc		$ 295	$199
SuperWriter		$ 399	$269
Spellguard		$ 195	$129
STC, The Creator	NEW!	$ 300	$195
SYNERGISTIC, Data Reporter	NEW!	$ 250	$189
★ VISICORP, VisiCalc®/256K		$ 250	$175
VisiDex or VisiSchedule, each		$ 250	$199
VisiTrend/Plot		$ 300	$219
VisiFile or Desktop Plan I, each		$ 300	9239

UTILITY

1983 CE SOFTWARE AWARD:
Copy II PC by Central Point Software is the best CE software buy of 1983. It will copy more copy protected software and faster than any other backup system. Unlike other copiers it makes an exact duplicate of your original and it does 100% verification of copy. Documentation is excellent.

CENTRAL POINT, Copy II PC, Backup and Utility	NEW!	$ 40	$ 35
★ ComX, Fastrek, RAM/Disk emulator program. Works on any PC DOS version or RAM Card. Menu driven		$ 100	$ 49
DIGITAL RESEARCH, Concurrent CCP/M 86		$ 350	$235
CBASIC 86		$ 200	$225
RORELL DATA, System Backup		$ 50	$ 35
RORTON, Norton Utilities, 14 powerful programs, 3 disks		$ 80	$ 65

HOME & EDUCATIONAL

AUTOMATED SIMULATIONS, Temple of Apshai		$ 40	$ 28
Od Barons	NEW!	$ 100	$ 75
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PC-Communiques

compendium of facts, news, opinions, gossip, inside intelligence speculation, and forecasts about IBM Personal Computers.

omething Old, omething New, omething orrowed, omething Big nd Blue

e marriage between IBM and lel (IBM recently acquired a 12-ocent interest in Intel) appears oe off to a peachy start. Intel, oiich supplies the microproces-t for the Personal Computer, developed a course to teach X°X 86/88 architecture to those M employees involved with PC. Through a series of lec-ses and laboratory exercises, employees will learn the in-uctinn set of the 8086 and 88 processors, enabling them program the PC.

The course will not train em-oyees to develop applications ftware for the PC. This under-nores the fact that the PC is not levelopment system. Writing in eleads (an Intel publication), a kokesman for the company iinted to this development as mother example of the rapport el is building with IBM. So far, e response within IBM for the urse has been tremendous," he bid.

°C Faire Tyme!

ne first IBM PC Faire will be leld in San Francisco's Civic Au-torium and Brooks Hall, Au-ust 26-28. Faire Chairman Jim s'arren, a veteran organizer of e West Coast Computer Faires, planning 550 exhibit spaces. he Faire hopes to attract repre-entatives from the business and ducational communities, as well s computer enthusiasts. For more information, call (415) 851-077.

Battle of the Infant Micros

Competition in the under $100 computer market is about to rev up a couple turns. Texas Instruments plans to ship its 16-bit Model 99/2 in June, just in time to face the Timex ZX-Spectrum, an 8-bit machine with a Z-80 processor and a color display nptinn (which, at $149, will sell for $50 more than the black and white model).

The two micro behemoths have faced each other once before in a struggle for dnminance of the digital watch market. Texas Instruments was handicapped by its dependence on outside manufacturers for digital display parts. Timex won handily.

In the battle to come, the tables are reversed. Timex will purchase certain components from third-party vendors. However, the giant watchmaker boasts a wider distributinn network. Both companies are expected to throw everything they've got into the race, which is to say, millions for advertising. Meanwhile, Digital Research of Pacific Grove is reportedly working with Mattel, Inc. to install CP/M on a $200 computer.

Of course, the race may get more crowded. Should IBM decide to introduce a Peewee PC, the toddler could make up for a late start with a firm push from its colossal parent.

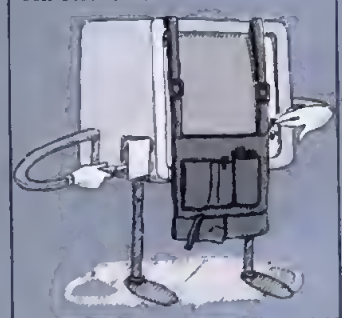
The Wild Bunch

The frenzied lateral mobility of computer programmers and systems designers shows no signs of abating. Employees of one company often walk across the street to the competition, lured by sweeter perks, better salaries, a more pleasing view, or whim. In January, a hardy bend of 17 Intel engineers walked from that company's Portland office to kick off a highly secret venture temporarily (and pointedly) called "Sequel, Inc." Most of the engineers boast extensive Unix experience.

Rumors, of course, abound about their project. Perhaps a diskless, Unix-based system that uses between one and three 16032 or 32032 National Semiconductor chips with voice exchange capabilities tying to cable? Sequel won't say.

Robot the Riveter

Did you know that the Japanese-built IBM 7535 robot assists in the assemhly of PCs at Boca Raton? The 7535 is a jointed mechanical arm that can move in four directions. It can be programmed in AML (a manufacturing language) by the PC. Interested? The PC configuration used to program 7535 (plus the software) costs $5,575. The automaton itself costs $28,500.



Illustrations Stuart Bradford

PC-Communiques

Hey, You! Buy This.

We hear so much about Japan's worldwide domination, or near domination, of automobile, audio/radio, and photography markets that we've neglected to notice giant strides in other areas. Land-poor Japan, for example, is a leader in development of aquaculture—or fish farming, though "fish" can refer to edible algae (seaweed), crustaceans, and other marine comestibles.

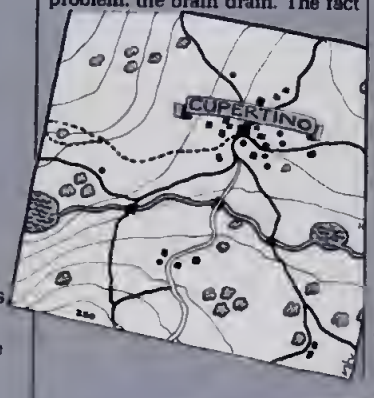
The Japanese have also invented a way to freeze-dry whiskey, which may or may not be good news. But there are two other products we can certainly live without. One, an automatic "bow meter," appears to pose no threat to the domestic tranquility. The device is used in large Tokyo department stores to train employees to achieve the appropriate degree of obeisance to shoppers, depending on their status—which is, of course, measured by the size of their accounts at the department store.

The other development, we're sorry to report, may have potential in the U.S. The Japanese are combining speech synthesizing and photoelectric technology with . . . vending machines. When someone walks by a vending mechine so-equipped, he trips an invisible beam and loosens the insistent tongue of the mechanical merchant. "Buy a Coke!" it may demand, or "Refresh yourself with a whiskey popsicle." With Japan's impressive expertise in robotics, we're afraid to guess where all this may lead—perhaps a talking vending machine thet bows if you buy a coke and chases you if you don't.

All Roads Lead to Cupertino?

Regional Silicon Valleys are cropping up all over the country, indeed, throughout the world. King Hussein of Jordan aims to make his country the computer mecca of Araby. The Republic of Ireland, as part of its intense effort to industrialize, is wooing foreign manufacturers with favorable loan terms and export assistance. Multi-netionels are lured to Singapore by that strategically situated city-state's tradition of unabashed capitalism, political stability, and a cheap, willing work force. India boasts a well-trained bank of programmers, many of whom work for the subcontinent's largest computer firm, Hindustan Computers.

Except for Japan, many countries promoting domestic computer-related industries face an old problem: the brain drain. The fact is, many foreign programmers and other computer wizards c not resist the wicked lure of t West, especially the U.S. Mar American companies actively cruit abroad—and with enoug success to agitate at least the nor foreign competition. The jor foreign competition (guess who?) is another story.



Listen Up, Bug Tussle, Oklahoma!

You too, Rabbit Hash, Georgia; Rough and Ready, California; a all points in between. We've re ceived many inquiries from rea ers complaining that their near PC Users Group is too fer away for them to participate. Apparently, CompuServe is also aware o the problem. The Columbus, Ohio-based computer network now boasts the first electronic IBM PC Users Group.

The 350-member association is divided into sections for user updates, product reviews, programming, software libraries, a on-line conferences. It plans to hold regular nationwide on-line meetings, which are open to an one with PC communications c pability and access to CompuServe. For more information, c tact Mike Todd at (202) 561-5187.

"YES, HE is a modernist in the sense of a computer, in t sense of precision of word and gesture,"

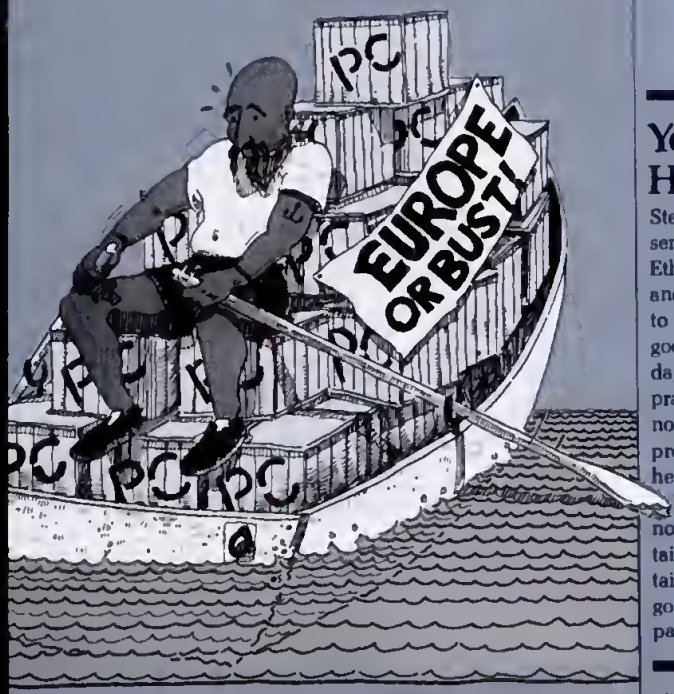
French Foreign Mi
Claude Cheysson desc
Soviet premier, Yuri V. And

The Art of IBM

Madrid, it's the Prado. Paris has the Louvre; Leningrad, the Hermitage; London, The National Gallery; and New York, the IBM.

The IBM? Something amiss here, or at least the cultural czars of New York fear so. Seems IBM, which owns a number of paintings and other objets d'ort, is planning to open a public museum at its new corporate headquarters in Manhattan. Officials from the city's leading museums worry that Big Blue's new interest in exhibits will affect its heretofore generous corporate support of public arts institutions.

Not to worry, says IBM. The headquarters gallery will emphasize traveling scientific and technological exhibits rather than Picassos, Pollecks, and Peruzzis.



A Mark, a Franc, a Buck, or a Yen

A spokesman for Dataquest, a market research firm in California, spoke recently at an industry seminar in Silverado, California. He predicted that by 1987, fully one half of the PCs manufactured will be sold overseas. At the rate things are going, we wouldn't be surprised. For more on the PC abroad, see "Parlez-Vous PC?" and "Tie Me IBM Down, Boys" in this issue.

You Can't Go Home Again

Steve Wozniak, speaking at a seminar on "Computer Industry Ethics" at the CP/M-83 Conferance in San Francisco, admitted to a pervasive nostalgia for the good old, pre-lewsuit, homebrew days when humor was looser and pranksterism abounded. "Woz" noted that he was perhaps "most proud of" a Dial-A-Joke machine he invented early in his career. He also fondly recalled his announcement of the bogus "Zoltair" (to compete against the Altair, presumably). Those days are gone forever, he lamented to the packed audience.

Supply and Demand

When IBM began selling PCs in October 1981, it was not able to authorize as many dealerships as it would have liked, due to a limited supply of Personal Computers. As of January this year, there were 650 authorized dealers, but a backlog of requests for franchises still exists.

In evaluating a potential dealer, IBM takes a close look at the appearance of the retailer's outlet. Big Blue also considers location, professional standing, track record, business volume, and warranty/service follow-up. Corporate visitors "drop in" once a month to discuss product forecasts, review business plans, and generally take a good look around the shop.

So, What Else is New?

Soon after introducing the PC, IBM was widely criticized for promoting a product that lacked requisite software support. Big Blue typically refused to comment. It was clear, however, that IBM's strategy was to let the marketplace respond. This gamble seems to be paying off, which is good for both the PC user and IBM (although the PC is reportedly not yet profitable, which is neither surprising nor alarming at this still early date). Established manufacturers, individual programmers, and to an extant, even IBM itself, are constantly introducing new programs and peripherals for the PC.

In fact, so many products are coming down the chute, it's very difficult to sort them out. Now, there is a 24-hour bulletin board service to help keep users informed. Dubbed the "PC Information Network," it offers hardware and software reviews, public domain programs, and other information. Contact James Locker (616) 327-8228 or 329-1000.

PC-Communiques

All The Rage

General Motors did it. Boeing's reportedly considering it. Why not Big Blue? IBM has already begun discussions with giant Matsushita Electric Company of Japan about the possibility of a joint venture to develop and manufacture such low-cost products as terminals, office automation systems, and small business computers.

The joint venture talks underscore IBM's readiness to sell third-party products under the IBM logo. IBM already markets a robot system built by the Sanyo Seiko Manufacturing Company, and copy machines produced by Minolta. An industry spokesman calls the latest move, "a bellwether of things to come." Question is, who's courting whom?

Computerized Indexes

Students, librarians, novelists, researchers, teachers, editors, writers, and other careful readers take note: Peter Norton, while preparing his book, *Inside The IBM Personal Computer*, wrote a series of DOS-based programs for generating book indexes.

While reading a reference book such as *Abalone to Zucchini, A Laymon's Guide to California Agriculture*, for example, you could enter every mention of kale, kohlrabi, and cabbage as you proceed. The program will sort the references and display each one with the appropriate page numbers.

The program, of course, works equally well with fiction, anthologies, biography, and text books. If you could use Norton's computer indexer, send a formatted disk and a self-addressed, stamped envelope to Norton Utilities, 2210 Wilshire Blvd. #186, Santa Monica, CA 90403. To assure safe delivery, use a well-padded, static-resistant envelope. Happy Indexing.

Overheard at the Queen's Banquet

Herb Caen, oracle of the San Francisco Bay Area, patron saint of three-dot journalism, gossip extraordinaire (though he may bristle at this moniker), popularizer of that desperate journalist's plaint, "Item, item, who's got an item?"—and daily (except Saturday) columnist for the San Francisco Chronicle, provided an IBM angle to Queen Elizabeth's recent visit to soggy California.

In his column of March 9, Caen wrote, "At that now historic State Dinner, J. Gary Shansby, chairman and CEO of mighty Shaklee Corp., found himself seated at a table that included Steven P. Jobs, brash 27-year-old chairman of Apple Computers. 'What business are you in?' Jobs asked him, and when Gary replied, 'Vitamins,' Steve continued, 'What's the name of your company?'

'Shaklee,' said Shansby, at which Steve nodded.

'I've heard of you,' he said grandly.

'You should have,' grinned Shansby, 'we just bought 50,000 IBM Personal Computers!' . . . (Jobs has been on the phone ever since trying to reach Shansby to talk business.)"

Herb said it all. Or Jobs did. No, the prize goes to Shansby. In any case, thanks for the item, Herb.

Pick of the Litter

The Society for the Prevention of Cruelty to Users (SPCU), a non-profit organization created to evaluate IBM PC software, has announced publication of *User Hotline: The Softbook of IBM Personal/Home Computing*.

Founded by a psychologist, the SPCU tests new programs and describes them in step-by-step, nontechnical language. The book, available this fall, emphasizes information management for families and self-employed people. For more information, contact SPCU at 6716B E. Cedar Avenue, Denver, CO 80224, (303) 388-2380.

Health Insuran Isn't Enough

We've received further evidenc that employee benefit packages aren't what they used to be. Ha riet and Henderson Yarns, Inc Henderson, North Carolina (m to: "Finer Yarns For Finer Fab rics") is spinning the IBM PC into the skein of standard com ny employee offerings. Harriet and Hendarson already relies o an IBM System/38 and three S ries/1 computers to help sched work at tha mills, control orde and provide price and supply formation to its cotton buyers.

In order to foster better und standing of various computer-r lated jobs in the company and promote computer literacy amo the staff, the company offers IB PCs to its 1500 employees at d count. To bolster the offer, it h established a three-week comp er coursa at nearby Vance Gran ville Community College. Ac-cording to vice president of fi-nance Phife Ross, "This progra will give us more value than a other brand of education we of people here. We're committed Involve the computer user in th aystem."

PC-Communiques Pays

Do you hava news, gossip, or unusual computer tales for *PC-Communiques*? We will pay up to $50 for aach submission used. You must include your name, addrass, and telephone number with tha item. Wa will preserve you anonymity if you wish. All submissiona become the proparty of *PC* and are subject to editing. Our *User-to-User* section also publishes and pays for readers' submissions; that section featurea tips, problem solutions, and short programs or routines. Pleasa sand submissions to tha appropriate department—*PC-Communiques* or *User-to-User*—at *PC*, One Perk Ave., New York, NY 10016.

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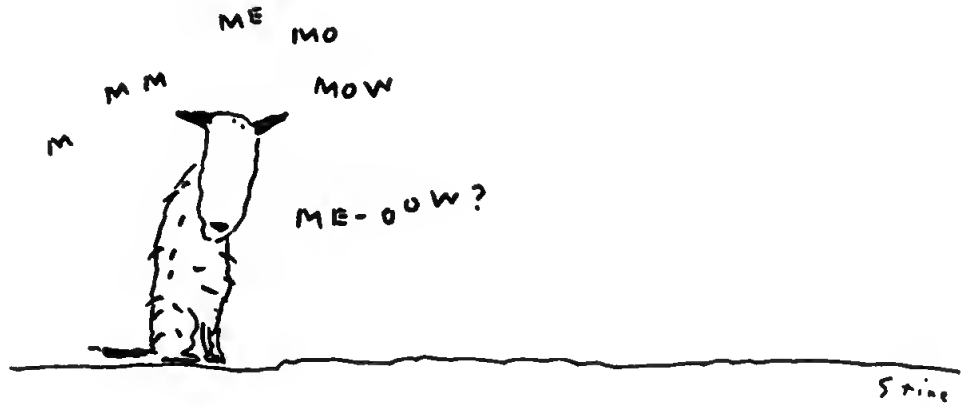

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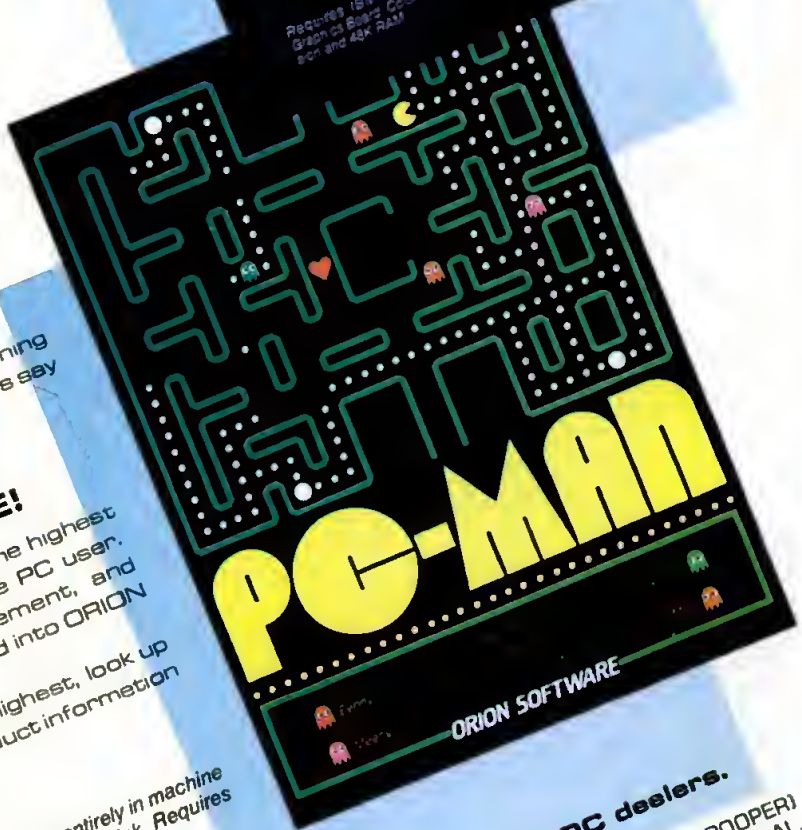

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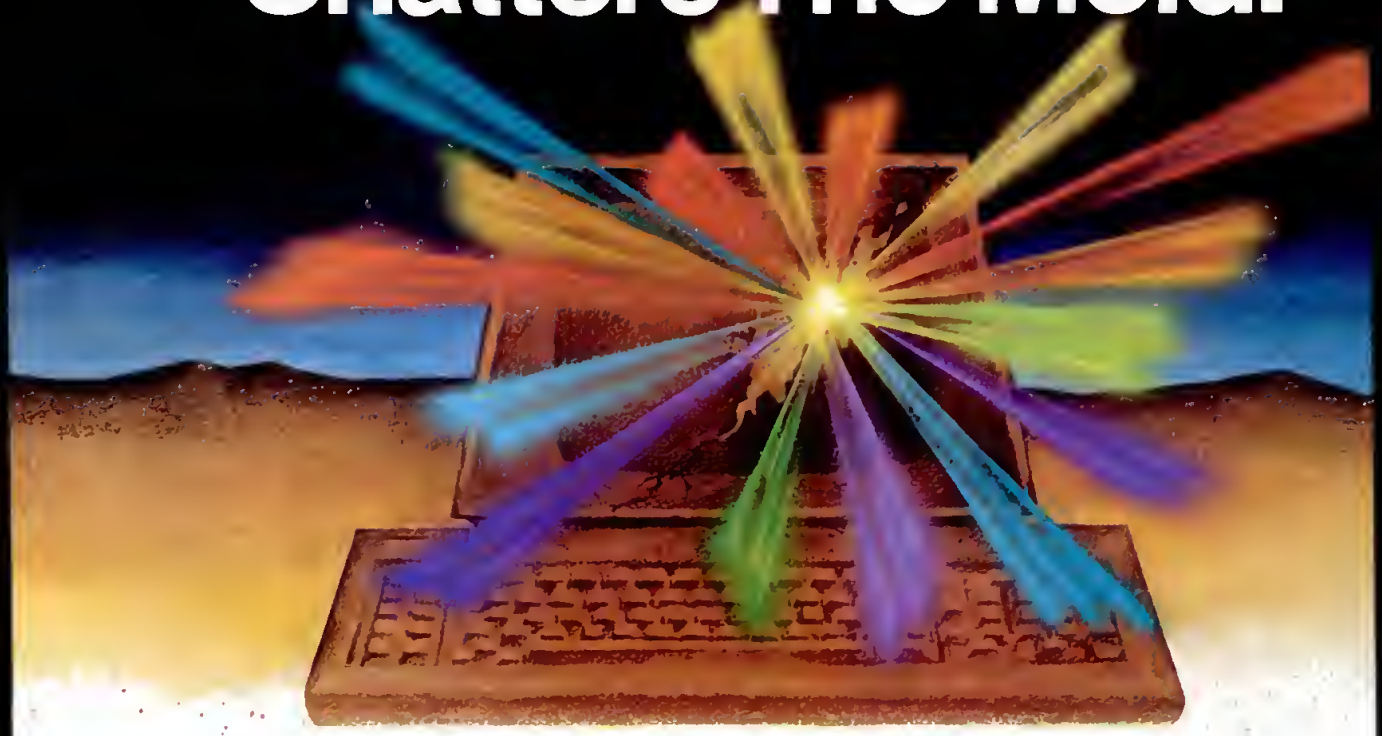

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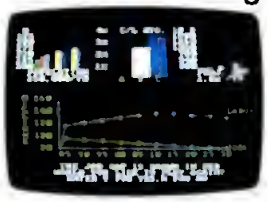

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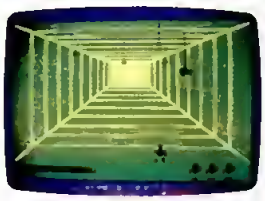

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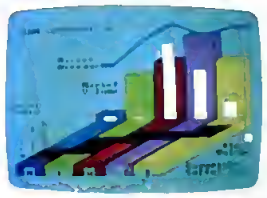

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estions about PC-DOS, its hidden files, error messages, d copying commands. Learn about using multiple monitors, AM-disks, and tricky subscripts from the PC Tutor.

Delving Into DOS

nerasing Files

sometimes erase e file by mistake. Is e any easy way to get the file back?

Velerie Endes
Flarence, Alebama

Unlike CP/M-80, with PC-DOS you not retrieve a file after it has been ed. The reason for this is that DOS ntains o list of which sectors on the go with each file. When you erase a oll of its sectars are set to an unused us. This is a permanent change and e is no woy to olter it.

The advantage to a scheme like this is it lets spoce be used efficiently, while mitting a very large file to be easily d in random access mode.

ck to the Monitor

I would like to be able to display a oh on the colar graphics displey pter and then switch back to the nochrame display without interrupt- the text already on the manachrome play. Is there an easy wey to do this?

Jules Carroll
Beeverton, Oregon

t is not easy, but it can be done via the owing BASIC program (see Figure 1). f you don't mind disturbing the nachrome display, there are easier roaches. This program will read all of infarmation pertaining to the mono- ome display, switch to the color dis- y, and when that display is finished, it ts all of the monochrome informa- n.

CHKDSK Error Messages

Q: What does the error message "files cross-linked" meen? It eppears when I run CHKDSK. Daes this mean that the disk is unuseble?

Phelps Gates
Chepel Hill, Narth Carolina

A: *The CHKDSK program is a workhorse that daes much more thon finding out haw much disk space is available. It alsa checks over all af the PC-DOS file-allacation information. The "files cross-linked" error message means that CHKDSK found an internal inconsistency on your disk.*

CHKDSK will rectify the mistake, if passible. If you run CHKDSK again and it no longer prints that error message, then the disk has been cleaned up as much as passible. Most likely two of the files will no longer be accessible, but the rest of the disk may be usable.

CHKDSK can report a number of messages. The message "nnn Bytes freed," for example, is not about an error at all. It appears after yau interrupt a program that was writing a file to disk. Some space had been allocated for the file, but the directory entry was never written. When that happens, CHKDSK deallacates the storage, and you can use thase sectors again. Same programs also will cause this message to appear if they erase a file incorrectly.

Another message, the one you saw, is the "files cross-linked" message. Thot is an error, and means that samehow two files were faund to have sectors in common. This error may be caused by insert-

Figure 1: Methad far rapid switching between calor and monochrome screens.

```
10 REM enable color adapter, then return to monochrame
20 DEF SEG = &H40 : DIM A%(30)  REM setup
30 POKE &H10,&HCF and PEEK(&H10)  REM enable color
40 REM now read all of the old video information
50 FOR I=0 to 29 : A%(I) = PEEK(I+73) : NEXT I
60 SCREEN 1  REM use the color/graphics display
70 REM do any color/graphics you wish here
80 REM now put everything back as before
90 POKE &H10, &H30 or PEEK(&H10)
100 FOR I=0 to 29 : POKE (I+73),A%(i) : NEXT I
110 REM now back in monochrome mode
```

ing a disk in a drive while a program is writing to a file. When PC-DOS updates the directory entry, it may not check for such a mistake, and so the disk-allocation mechanism gets scrombled. A common way that this occurs is that you put in the wrong disk, find that it is write protected (whew!), and afterwards insert the correct disk.

The other error message I have seen when running CHKDSK is "file allocation size error." This message means that the value in the file entry for the size of the file does not agree with the number of sectors that actually belong to that file. The causes of this error are similar to those that result in the "cross-linked" error, and the end results are similar. In this case, some of the information in a file may get lost, though the rest of the files may be OK.

Letters High and Low

Q: I do a lot of technical typing on my PC. Is there any way to generate superscripts and subscripts by using the graphics card? Can these symbols be printed?

Jeff Cochran
Kansas City, Missouri

A: In order to print superscripts or subscripts you need to purchase a program that can take advantage of the abilities of a given printer. The Epson or IBM PC printers do have subscript/superscript capabilities, but most programs fail to take advantage of them.

Getting superscripts or subscripts to appear on a display is a more difficult matter. I can show you a BASIC routine that will do this, but I know of no programs currently available with this capability. My method takes advantage of a glitch in PC-DOS. When PC-DOS calculates where to locate a character, it reads information from memory to find the number of characters per line. You can mislead it by putting incorrect information into that memory location to make it display a super- or subscript when using the color/graphics card in a graphics mode (either SCREEN 1 or 2). The pointer for characters-per-line is at location 0040:004A hex. See Figure 2 for a BASIC program that will show what it can do.

Try this program out to get a feel for how changes in location 0040:004A will affect DOS. This will certainly cause strange scrolling, so it is best to reset the value to the right number immediately afterwards, as is done in line 90.

Duplicate Commands?

Q: What is the difference between DISKCOPY and COPY? Is there any advantage to using one over the other?

Francis O'Brian
Scranton, Pennsylvania

A: The two programs are very different and so are their effects. DISKCOPY takes a disk and makes an identical, bit-for-bit copy of it. DISKCOPY will also format the target disk if necessary. Also, a related program, called DISKCOMP, will report that the two disks are the same, if no changes have been made to the target.

COPY, on the other hand, is a program that reads one file at a time and then writes it to the target disk. If the target disk is not already formatted, you will see a read error message with the usual "Abort, retry, or ignore" instruction. If the target disk already has some files on it, then at some point the target might fill; when this happens, COPY will stop running.

Because of the way the file-allocation mechanism works, a copy made by using COPY to make a new copy of the c eliminate fragmentation on the ne Refer to the file allocation appe IBM's DOS manual for more infor on how this procedure works.

Figure 2: Short program for inserting a subscripted character on screen.

```
10 REM write a subscripted A on the first line
20 DEF SEG = &H40
30 SCREEN 2     REM actually 80 columns
40 CLS
50 PRINT "TRY This";
60 POKE &H4A,40   REM pretend 40 columns
70 LOCATE 2,4     REM to the right of the "Y"
80 PRINT "A";     REM prints as a subscript
90 POKE &H4A,80   REM reset to 80 columns
```

DOS maintains a list o which sectors on t disk go with each

Hidden Files

Q: In Volume 1, Number 7 of responded to a question regardin COPY and the change it makes in formatting configuration: whe DISKCOPY a single-sided diske copy is always in single-sided for order to use the additional 160K a in the double-sided format, I us command COPY *.* B: to copy fro gle-sided disk to a double-side When I ran CHKDSK afterwar report told me that two hidden files were not copied. I know tha are programs for sale that can u hidden files, but is there a way t pletely transfer a single-sided form onto a double-sided format disk v having to go to that expense?

John L. E
Mt. Prospect,

A: You can not use COPY to copy files unless you reveal them first. den file is a file that is completely so it is inaccessible from PC-DO mands, including COPY. If you bought a program that actually co hidden files, then COPY will not However, if you just want to put t DOS system, including its two h files, on a double-sided disk, the ways to do that.

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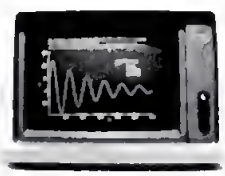

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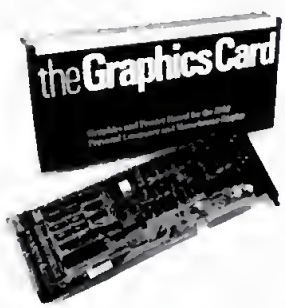

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The simplest way is to formot the disk with the system option, using the command A>FORMAT B:/S which will format the disk in drive B and then copy PC-DOS onto that disk. Once this has completed you can then put the disk you wish to copy into drive A, and type A>COPY *.* B: which will copy all of the disk's unhidden files. The two hidden files that come with PC-DOS were already transferred to the new disk by the FORMAT program. When you run CHKDSK on the new disk, it will shaw these twa hidden files, as you desired.

Smoking Displays

Q: I have two questions that I would like answered. First, I attempted ta failaw instructions given by e reeder in PC-Communiques (PC Volume 1, Number 3) ebout connecting the IBM color/graphics card to the IBM monochrome display. Much to my dismey, smoke started coming from the display, which hed to be repaired. Dare I try again?

The second question should be safer. Can you recommend e color television to use with the colar/graphics card?

Sol Taskin
Redding, Califarnia

A: First, under no circumstances should you ottempt to hook the monochrome display odapter up to the color card. Those published instructions were incorrect. Although you could use the two boards in this manner, PC-DOS will not understand what has happened. The net result is thot

> ***MUCH TO my dismay, smoke started coming from the display.***

sync signals will be set up to drive a color display. As I explained in an earlier column, color displays are significantly different from IBM's monochrome display.

By using this methad you have taken a display with an 18 kHz scan rote and tried to use it at 15.75 kHz. Most displays put the sync signal through o special transfarmer to get the very high valtages needed to drive the CRT tube. The net result is that the incorrect sync frequency will cause the monochrome display ta be fed the wrong high valtage—hence a smoking display!

Although both cards use o 6845 chip, and softwore can be written thot ollows o monochrome adapter to work—sort of—with the color display, you should not attempt to repeat this experiment. Even if it were safe, the results would be useless, as the characters on the display would be unreadable.

As to picking a calar televisian . . . A number of manufacturers are coming out with color televisions that can be used as monitors with composite input copabilities. If yau wont RGB capabilities, then the only suitable television I knaw of is the Sony Profeel. To use the Profeel you will need to change sync polarity.

I am not convinced that the Profeel is worthwhile as o graphics display since it is roted at less than 640 dots across its screen. Yau can, however, get a high-resolution color monitor, and then ottoch an odd-on television tuner with RGB outputs. The cost of the tuner, however, will probably exceed the cost of a high-quality television set.

Controlling Keys

Q: I recently wrote e word processing program in BASIC and heve run into e minor snag or twa. My program uses the key trapping features of the cursor control keys to position the cursor onto the plece where corrections ere necessary. This works feirly well. However, I would like to control the Num Lock and Caps Lock keys with my software. Could you describe the internal functions of these keys and the address, if any, thet I can POKE to control them?

Steven C. Lupton
San Diego, Californie

A: Both the Caps Lock and the Num Lock keys cause similar reactions in PC-DOS. After you push one, o flag gets set in memory to indicate that the status of the system has changed. If you own a Technical Reference Manual, check the listing for the data byte KB_FLAG. The bits of interest are bit 7 for the Caps Lock State, and bit 6 for the Num Lock State (bits are numbered from 1 to 8). Thus, if you want Caps Lock to be off, just set a 0 in bit 7. In BASIC, the code would look like:

```
10 REM turn Caps Lock off
20 DEF SEG = 64  REM DOS data a
30 POKE 23, &hBF and PEEK (23)
   turn off bit 6
```

> ***THERE ARE many scientists and engineers who would like to use scientific word processing.***

If you want to turn off the Num Lo just use &hDF instead of &hBF in line To turn Caps Lock on, you would &h40 or PEEK (23).

Scientific Symbols

Q: A number of manufacturers have w processors that can display and print Greek alphebet and associated mathem ical equations. Has a dedicated scienti math word processor been developed the IBM PC? While this is admitted special epplication, there are many sci tists and engineers who own PCs would like to use them for scientific w processing.

John P. Bo
Ann Arbor, Michig

A: Although I ogree thot such o progr is needed, there is not, at present, o sa factory scientific editor for the PC. I presently writing one for myself. Unfor nately, it requires about $4,000 of ex hardware to generote the necessary perscripting, subscripting, and spec fonts.

A much cheaper opproach is to mo fy the character ROM that was suppli by IBM. You can buy a new ROM Motorola MC68764, for about $40 inclu ing programming. The only editor I kn of, however, thot can display these od tional characters on the PC is EDIX. using EDIX with WORDIX (the progra formatter half) you'll have a "what y see is what you get" editor that uses t 256 characters available on the ROM. few characters are unattainoble due PC-DOS's use of those characters for o er purposes, such os line feed.

t RAM-disks Work

waald appreciete further details on things yau mentianed in PC Tutar Valume 1, Number 8). First, haw da make use af 576K in the PC for RAM-s? Also, is there any way ta patch dStar ta make it seek its subroutines RAM-disk ar a drive ather than drive

Jeffrey Speiser
San Diega, Califarnie

The way I use a RAM-disk is by per-iently allocating that memary space e a RAM-disk by means af switches de the PC. Although some RAM-disk grams allacate starage when they are I write so many assembly language grams that die and require a reset thot handy ta make sure that PC-DOS nev-nvades my RAM-disk. As a result, augh my PC has 576K, it never uses e than 256K for a program. The ches inside the PC are set ta inform DOS that my machine has 256K.

As far patching WardStar (WS) ta use AM-disk: if you run WS from a drive, it consistently search far subroutines

hot drive. Ta accammadate it, da the owing:

A>COPY WS*.* C: (this copies all WS gram files ta the RAM-disk).

A>C: (move to RAM-disk as de-lt).

C>WS file: (far whatever file I edit).

Nate this bug: if yau lag in a new disk :h as B) with WS, it will begin using A drive far the program files. /PC

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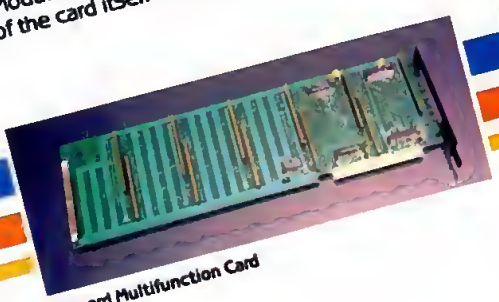

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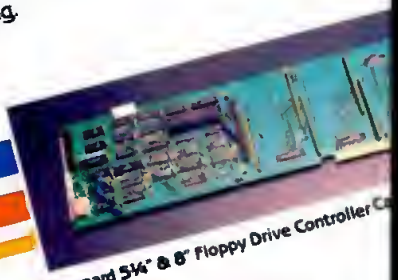

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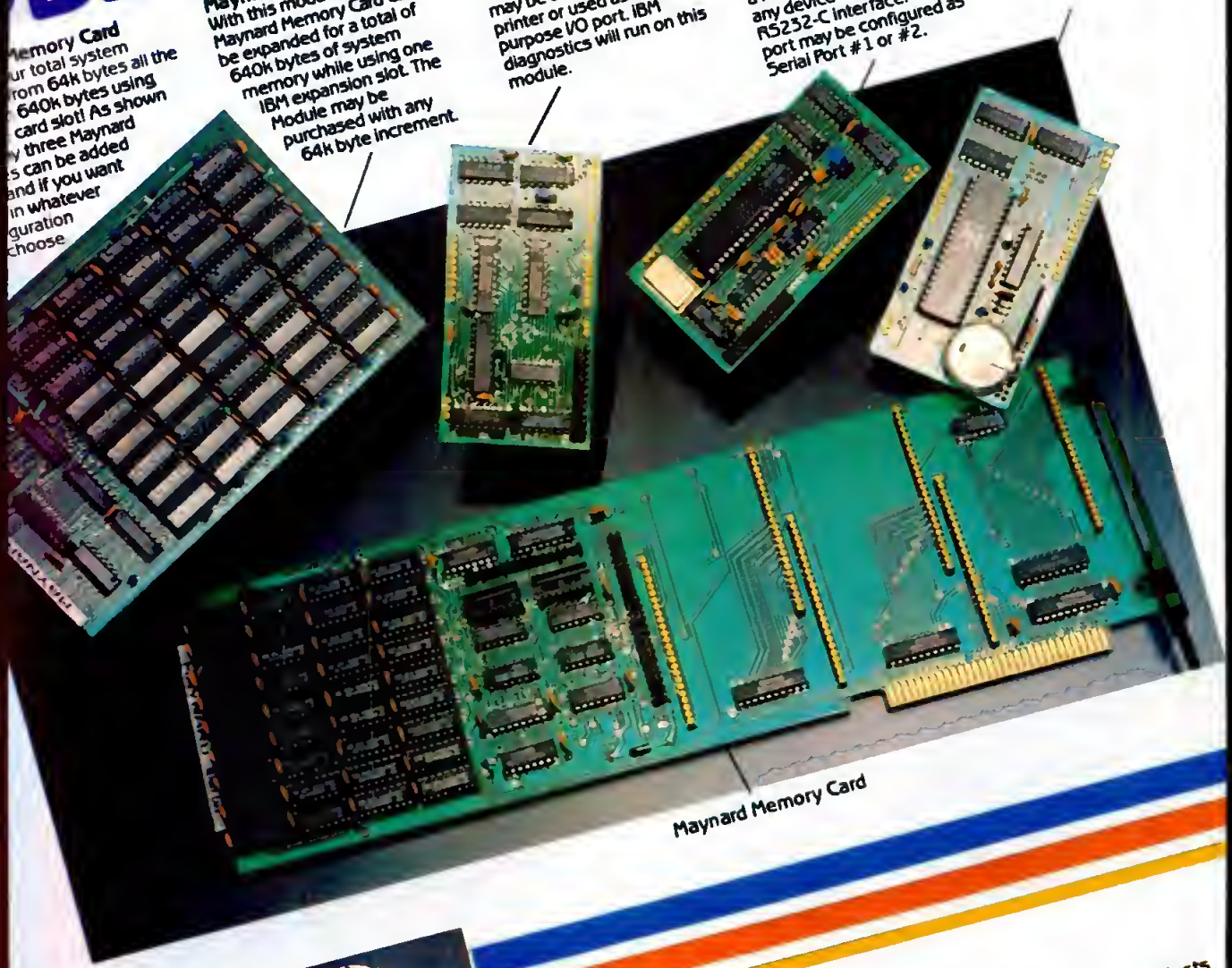

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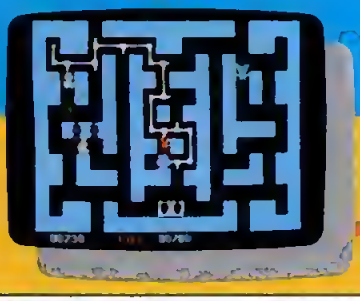

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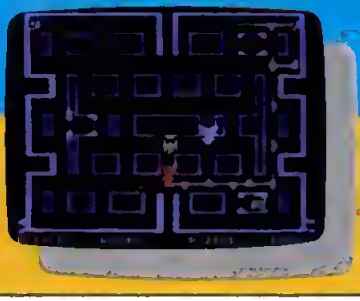

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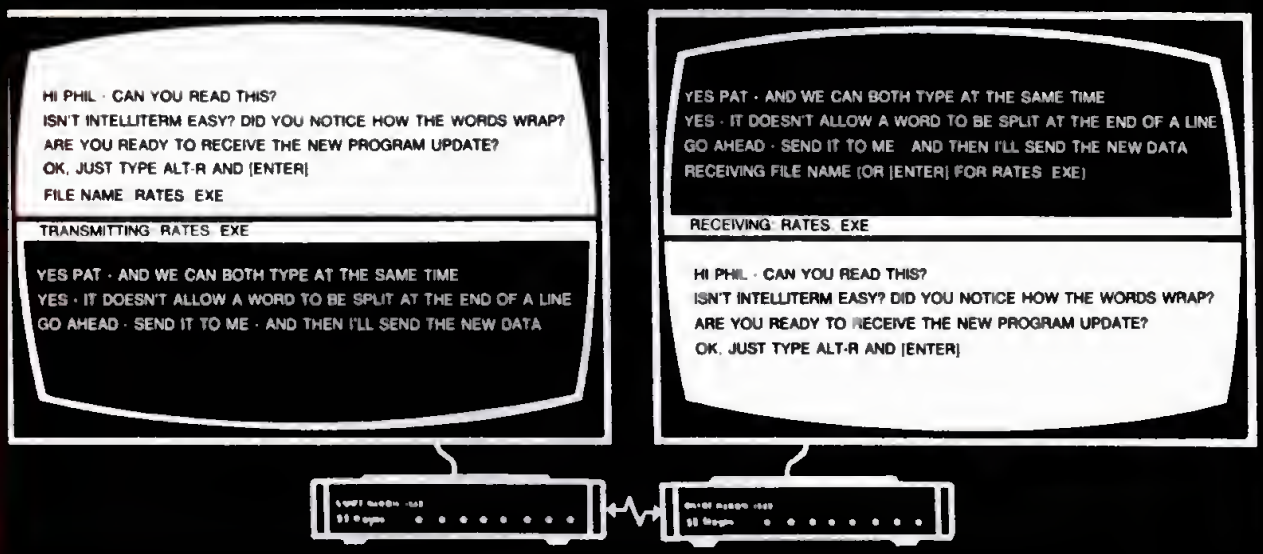

THE **INTELLIGENT** COMMUNICATIONS PACKAGE

INTELLITERM - The World's Smartest.

There is no more exciting area of computing than telecommunications. The ability to send written information across town or across the country - instantly at the speed of light. The power to tap literally hundreds of databases . . . the opportunity to work at home, write that manuscript with your word processor and then send it to the typesetters over the phone . . . the ability to do teleconferencing, electronic mail shopping over the phone are now all available to you thanks to microcomputer-based telecommunications.

Unfortunately, effortless communications have remained but a dream for most people. A dream that is tantalizingly close but ultimately separated from reality by a veil of parities, stop bits, baud rates and other electronic buzz words. But no more. Now there is INTELLITERM from MicroCorp - a program designed to make communicating with a desktop computer as easy as dialing the phone. INTELLITERM gives you all the power and flexibility of the most sophisticated communications software - but it can be used effectively by anyone. It is truly a "load and run" program. Less than 30 seconds after you hit [ENTER] you can be on-line and talking to THE SOURCE or COMPUSERVE.

The inexperienced user will appreciate INTELLITERM'S simplicity and ease of use. The sophisticated user will welcome the program's flexibility and power. It comes set up for standard communications, but changing to 1200 baud for example is as easy as moving a cursor control key. And you can change the settings on the run. But that is just the beginning.

MAJOR FEATURES

- INTELLITERM is the only communications package to offer a split-screen option, using three buffers to 'document' your electronic conference. Screen width is fully adjustable and each screen scrolls separately.
- INTELLITERM communicates at 1200 baud without losing any characters - even with the printer on! Two desktop computers connected together can talk to each other at the incredible rate of 9600 baud.
- File transfer of both data and object code is accomplished with a single key command for two Intelliterminals (two computers each running INTELLITERM). For those pesky mainframes, INTELLITERM also has a powerful ram buffer method of data transfer.
- UPLOAD/DOWNLOAD of programs to and from bulletin boards is automatic. Advanced protocol definition is available for the experienced IBM PC programmer.
- Remote control of an Intelliterminal using auto-answer modems for unattended two-way file transfer. HAYES Smart Modem support included.
- Optional bulletin-board option for electronic mail applications.

INTELLITERM is without a doubt the smartest communications package on the market today - a perfect compliment for your desktop computer.

HARDWARE / SOFTWARE REQUIREMENTS

IBM PC with 64K, Async Board, DOS 1.1
TRS-80 Model I or III, 48K 1 disk, TRSDOS or LDOS
Available soon on other computers.

INTELLITERM	$150.
Manual Only (Glossbrenner)	$25.
Bulletin Board Option	$50.
Communication Handbook (Glossbrenner)	$15.
Shipping / Handling	$4.

SPECIAL OFFER

Complete our pull-out card and mail it to us today! If you order Intelliterm you'll receive a FREE copy of Alfred Glossbrenner's new book, "The Complete Handbook of Computer Communications."

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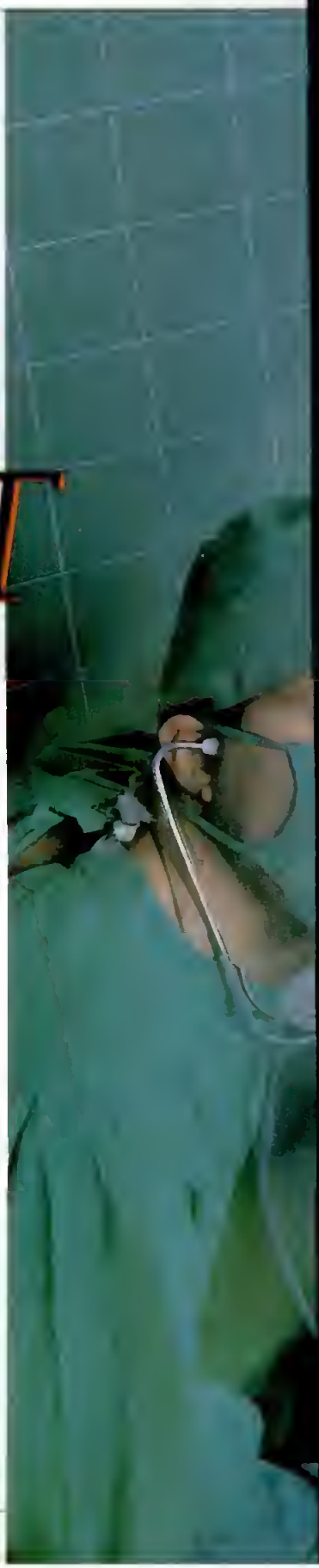
PC 4/83

CIRCLE 313 ON READER SERVICE CARD

COVER STORY/WINN ROSCH

Ben Franklin was right, even if he did get the wording wrong: A byte of prevention is worth 128K of RAM.

AVOIDING THE WORST



No metter that it costs only e few grand, heving e computer with that unique three-letter marque—IBM—imbues the owner with a special sense of pride. A netural outcome of this emotion is a desire to levish special care on the machine, doing whatever you can to keep it looking show-off new and running its best as it ages.

Sage Advice from the Creator

At first blush, it might seem thet regular maintenance end care are unnecessery, thet pregmetic PC owners need not lift a finger to keep their computers running well for years.

The cornerstone of the IBM PC design philosophy was to build as reliable and worry-free e computer es possible. Explained IBM spokesman Dan Scherer, "We tried to design a machine that required e minimum of preventetive meintenance." Asked to give the fectory's best edvice on teking care of the machine, he responded, "Just use the common sense thet God gave you."

Scherer cautions that a persooal computer, though a business tool, is elso e precision instrument. Although the IBM PC is rugged and relatively tolerant of its surroundings, it does have limitations.

"Be reasoneble," he said. "Don't plen on using your computer on the steel mill floor." According to Scherer, the best preventative measure is to avoid placing the PC in e hostile environment. In general, the PC will perform best at the seme temperature and humidity comfortable for its humen operator.

The computer should be given the same considerations as importent bookkeeping records. Just as a spilled cup of coffee would be disastrous to a paper ledger, the PC keyboerd would likely succumb to such a drenching. In other words, keep overbrimming beverages away unless the equipment is covered by flood insurence.

Floppy disks for the PC (or any other computer) require e bit more cere than their peper counterparts. The following procedures ere recomended.

- Keep disks awey from megnets such as those created by hi-fi speakers, power transformers, and electric motors. Magnetic fields from such devices can alter or erase irreplaceable stored date.
- Teke care to alweys keep the disks inside their protective sleeves, not in the disk drives.
- When reedying a floppy disk to be inserted into a drive, guard against touching where its magnetic surface shows through the slots in its case. The tiny bit of oil in e fingerprint cen be enough to gum up the works of a disk drive.
- Not only ere cigerettes harmful to the heelth of smokers, but they can have

Photograph Jack Resnick

deleterious effects on computers, too. Ashes have a devious way of finding high-precision parts (which include disk drives and even the disks themselves) to collect on. A speck of ash or even e single particle of tar from a cloud of cigerette smoke is enough to foul some disk units.

- Store floppies in protective sleeves or even an anticontaminant case.
- Avoid stetic electricity. Should you meil disks loeded with deta, be sure to use anti-static mailers. Also consider using anti-static sprays for dry days and en enti-static mat in the computer locetion. (See "Out, Damned Spark" in this issue.)
- To avoid computer damage from electric power problems—short voltage surges on the line that can zap your computer's innerds—you should always use e voltage surge protector to clip the transients before they can enter your machine. (See "Block That Bolt" in this Issue.)

To reessure its owner thet e trip to the shop is unnecessary, the PC is designed to make internal checks on its own. Every time the power switch is turned o runs through diagnostics just to sure ell of its circuitry is alive and w happy chirp a few seconds later is a ence that ell systems are go.

Any electronic eberration is auto cally flagged so that important docun or deta are not trusted to an untrust thy machine.

Should there ectually be a prob the IBM instruction meteriels conta section called "Problem Determina Procedures" to help each compu owner troubleshoot the system. The tion includes e "Diegnostic Aid I that will help locate problems in any of the entire PC system. For involved troubleshooting, the factory ommends thet PC owners consult dealers for maintenance and service

DO NOT USE cotton swabs! Strands of cotton fiber can come off and cause drive problems.

ond IBM Recommendations

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lations relating to care of a product
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may recommend oil changas at 2-
intarvals, but many car anthusiasts
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RATHER THAN owly grinding down, modern solid-state ctronics generally fail catastrophically.

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de cataclysm—flood, lightning, or
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ganarally operata satisfactorily for
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If naw PC ownars get past tha first 24
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burn-in at tha IBM factory in Boca
n, Florida, to cull tha damons before
owners hook them up.

or those who want an added margin
fety over tha factory's precautions,
aps the bast stratagy upon bacoming
wnar of a brand naw PC is to pull the
ling computer from its box, turn it on, and leava it on for a whole day.

Rathar than trusting irreplacaabla data to an as yat unproved machine, you can usa tha addad burn-in time to familiarize yourself with tha PC.

Onca you are satisfiad that the computar operates well, you can take extra steps to assure that your PC is in perfect shapa—and, in doing so, parhaps give tha machine and allied equipmant a mora trouble-frea lifa.

DISK DRIVE HEADS GIVE no hint that they are encumbered by dirt until they actually misread or miswrite data.

Keep It Clean

Dirt, and particularly dust, is a major adversary to any computer system's longevity. Not only is dust unsightly, a build-up can trap elements that are difficult to remove from plastic equipment cases and impair tha clarity of a video screen. Moreover, dust can also damaga tha computar's mechanical parts. A PC so layared with dust that it looks like a prop laft over from The Roiders of the Lost Ark is inviting disk driva and printer problems.

Fortunataly, such problams can usually be dealt with quickly and painlassly with tha gantla application of a vacuum cleaner. Usa tha finest nozzle available to draw dirt from inside the disk drives, from between the kayboard keys, and from within tha printer.

Tha dust that inavitably collacts on the monitor or CRT screan can be removad with a soft cloth and ordinary window claaner, in tha sama way that a telavision screan might be cleanad off. Tha PC usar who wants to be particularly careful may prefer to usa a special CRT cleaner, but in tha end tha results will be similar. The same window cleaner is parfact for removing smudgas and grima from all the computar and printar casas.

For toughar dirt on the printer or monitor, almost any household cleaner may be used—the tough plastic surfacas are immuna to most everyday solvants. Howevar, while tha paint finisb on tha matal cases of the keyboard and PC itsalf is also tough, it might be damaged under the applicaton of soma of the more powerful claaning solvents. So be wary. If in doubt, dampan a cotton swab with tha question-able-quality cleaning fluid and try tha results on the back or bottom of tha cabinets (so that if the solvent is too powarful, the tiny test damaga can be hiddan).

Usa cara whan spraying any fluid on the PC. Do not allow any to drift into the disk driva slots or tha slots covaring tha spaakar.

A dusty keyboard is ganerally vacuumad, though you may prefar to use a small can of compressed air equipped witb a long narrow nozzle, available from any art supply stora.

Rathar than spraying to remove smudgas from tha casa or keys, dampan a soft cloth with window claanar and gantly wipa avarything off. (Damp means, by the way, that nothing drips from tha cloth whan it is wrung out.)

Thosa who do not favor surprisa jigsaw puzzles should not attempt to disassamble tha keyboard to clean lt. Taking it apart ls lika opaning a jar of grassboppers; springs and parts are apt to fly off into hundreds of different directions.

Genarally, a PC is better off when it is protected from the dirt and dust around it. Not only will this keep it looking lika naw, but it will also help prevent potantial mechanical problems.

Tha bast protection against dust is a dust cover. (An electronic precipitator will halp matters too, naturally.)

Because tha IBM PC has provan ltsalf to be so popular, savaral typas of dust covars are availabla commarcially, aithar

from dealers or by mail-order. Or one can be made by the clever-of-hand with a yard of cloth and some elastic. Among various products, there is e choice between coveralls and individual covers for monitor, keyboards and computer.

The only precaution that needs to be taken with either prefabricated or bomemade dust covers is to be certain that the covering matarial itself does not generate static electricity when it is furled or unfurled. The little sparks are not only painful to the fingertips, but are potentially damaging to stored deta.

A HEAD-cleaning once every 10 to 50 hours of use should be often enough to prevent problems.

Should an all-inclusive dust cover be inconvenient—meybe it keeps knocking over that single-rose-in-a-bud vase next to the PC—the vulnerable disk drive slots alone can be protected with special covers specifically designed to lock out airborne pollutants. One such disk cover ls offered by Microcomputar Accassorles, Inc. (formerly Nat Hellmen III, Inc.), 5951 Firestone Blvd., South Gete, California 90280. Injection-molded from ABS plastic with a textured leatherette-look surfece to match the PC, it uses a closed-cell vinyl foam to safely seal drive slots from the outside world wben they are not in use. One covers both drive slots on the PC chassis. At $8 postpaid it's e good protection lnvestmant. (A companion keyboard cover of rigid lnjection-molded smoked bronze plastic is available for $12.)

A cover over the whole computer protects against more than just dust. "One of the main reasons a cover is necessary is the possibility of water damege in offices protected by sprinkler systams," observed Lorin Groscup of GL Computer Service. Through Yuba River Interiors, Post Office Box 1307, Grass Velley, California 95945, Groscup's Company offers a completa system dust cover with a vinyl exterior and fabric interior for $34.95 (plus $4 shipping, per order) as well as a printer cover for $14.95. (Other PC covers are available through the computer supply catalog companies.)

A recently-introduced degausser far remaving residual magnetism from all types of digital heads.

A multi-purpose routine maintenonce kit far personol computers.

Peripheral Considerations

Although there is no stendard recommended care for disk drives besides protection, their proper operation can be safeguerded by regular care.

Disk drives work like tape recorders in that they have "beads" tbat record end play back ("writa" and "read") their nals. As with tape recorders, disk-d heads can get dirty and magnetized.

Disk drive beads give no hint that are encumbered by dirt until they ac ly misread or miswrite data. Obviou then, it's important to clean tham reg ly to avoid date errors. Once every 50 hours of use should be often enou prevent problems, end can extend lifetimes of disks end the drives th selves.

With the proper tool, a head-cleaning , the chore is simple: The disk is pened with a speciel solvent, then for a few seconda in the drive unit. n products are evalleble from many ces. 3M Corporation makes a head- ning kit thet is availeble at many com- r dealers and computer supply mail- r catelog companies. Innovetive puter Products, 18360 Oxnard St., ane, Californie 91356, offers head ning disk kits es well es a variety of r personal computer care products. ther syatem, called Verfin, is manu- ured by Zolmen Internationel, 800 tgomery, San Francisco, Californie. Alcohol can be substituted for the ning solvent. Ordinary rubbing elco- is e reasonable substitute. (A 90 per- solution is preferred, but 70 percent fficient.) High-proof vodka will do in nch.

Those who do not wish to deel with ents (except, perheps, to drink the ka) may find "Datelife" heed-cleaning s mede by Verbatim (end eveileble n mail-order catalog computer supply panies) more to their liking. A pre- ted (pre-soaked) cleening disk is pro- d in e sealed envelope. The dispos- disk is put into a reusable jacket and rted into the drive slot for e fast, easy safe cleen-up.

The more adventuresome can go right he heert of the metter end cleen the /write heeds of their computer direct- y removing the metel cover from the hessis to reveel the drive mechenism. heads can then be cleaned—careful- as if they were audio or video ds.

A lint-free cloth (e "photogrephy-type

HIGH-PROOF vodka will do in a pinch.

mois," eveilable from most photo sup- stores) works well. Or dempen e video d-cleaning applicetor with solvent scrub lightly ecross the heads. Do not cotton swebs! Strands of cotton fiber come off and cause drive problems.

Once inside the PC cabinet, it's e good idea to consider the disk-drive heads, too. The constant rubbing of the megnetic disk past the reed/write head can cause the head to become megnetized.

Although the prevalence of the prob- lem is subject to debete, a concerned user will want to regulerly demegnetize his disk-drive heeds because there are no symptoms until it's too late and dete is lost. A new product, a computer-head demegnetizer, or degausser, is evelleble from Nortronics, Inc., 8101 10th Ave. North, Minneepolis, Minnesote 55427 and through deelers as model CMPF-205 et a suggested price of $35.95.

Any good quelity tepe heed demegne- tizer will probably do e reesoneble job. However, the pole piece, the rod-like extension of the degausser body, should be coated with e soft plastic compound to minimize the chance of demege to the disk-drive heed. Using eny degausser tekes less than e minute and is e good adjunct to regular heed cleening.

The degeusser is brought neer (or lightly touching) the heed end only then turned on, slowly removed from the prox- imity of the head—sey, to ebout 3 feet eway—end turned off. The key to suc- cessful demagnetization is to suddenly turn on end slowly reduce the elterneting magnetic field of the degeusser.

If you move your PC around from time to time, you should consider checking drive elignment occesionally. Should you own e porteble PC version, end transport it a lot, e 6-month elignment check sched- ule would be worthwhile.

Jim E. Vevrick of the technical support depertment of Epsom America, Inc. (which makes the stenderd IBM PC dot- metrix printer) advises that little regular maintenence is necessary for the printer. "It's built with the seme precise toler- ances as a watch so there's no need for oil to cover up imperfections," he seid. "Working on the printer should be epproeched with the seme concern es working on your wetch."

The only regular care he recommends is vecuuming out eny dirt thet builds up inside and replacing ribbons es neces- sary. He estimeted thet ribbon life extends to 15,000,000 characters. Rather then counting them, though, replece it when it doesn't print dark enough!

The print head itself should lest for ebout 5,000,000 lines, or 47 days of con- tinuous, full-speed operation.

The most common problem in using the printer is ceused by labels. Many are designed to releese after printing, or once they've rolled through the machine. They can come off, stick to the printer pleten (roller) and jam the works. To evoid the problem, either don't use that kind of lebel or don't wind them backward through the printer.

A HAPPY CHIRP a few seconds after turn-on is assurance that all systems are go.

When the printer is turned on and the pleten is turned menuelly, e good deal of resistance can be felt. Although the fecto- ry in Jepan claims thet such manuel oper- ation causes no damage, using the line feed or the form feed is preferred.

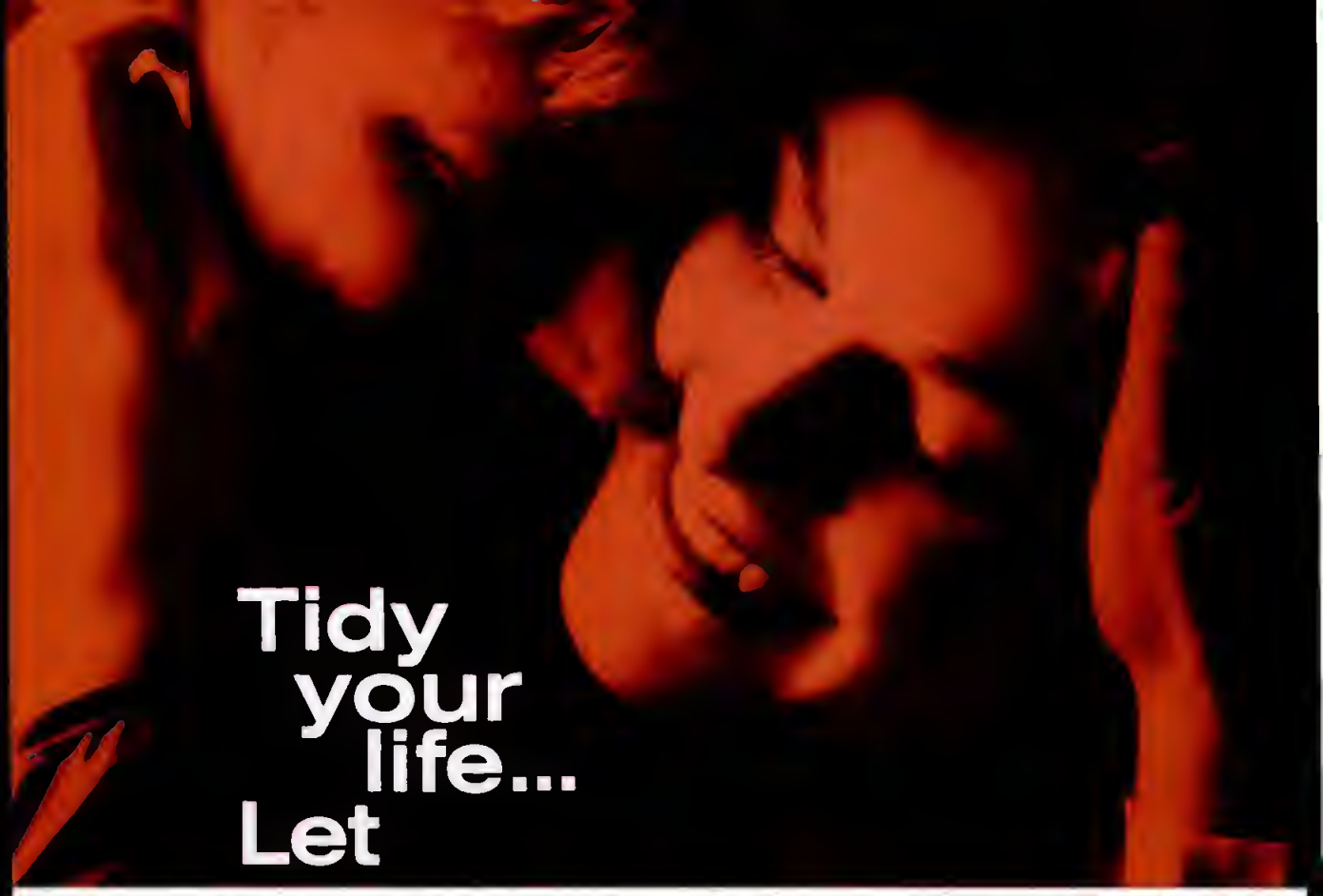
Doing-It-Yourself

Going beyond these simple preventa- tive measures requires e gient step—re- moving the case from the PC and tinker- ing around inside. Unless you heve suffi- cient electronics ecumen, it's best to keep hands off.

Outside of disk-drive heed cleaning, demagnetizing, and installing memory boards or similar options, there is little need to go inside the PC. Only two inter- nal parts—the rubber drive belts in the disk drives end the cogged belt in the printer—are ever likely to need ettention if the PC is properly cared for and pro- tected. Check them after a year of opere- tion.

Although user service is not recom- mended, a book outlining the proper pro- cedures for these checkups, as well as ell repair end service operations, is evailable from IBM through your PC deeler. Called *Hordwore Mointenonce ond Service*, the big loose-leaf binder reteils for $155.

Not e book to curl up with at night, it's designed for dealer service people end hard-core "tekkies." */PC*



SHOEBOX

schedule your affairs!

The fact is, you're probably spending too much time trying to keep track of your time and your expenses. Aren't there other things you'd like to do?

Do you suffer from any of these symptoms?

- **Missed appointments**
- **Blown deadlines**
- **Forgotten birthdays or anniversaries**
- **Lost expense records**
- **Unbilled project or client hours**
- **Late expense reports**
- **Trouble remembering what you've done or whom you've seen**
- **Lack of direction**
- **Uncertain priorities**
- **Not enough time for the really important things**

If you answered "yes" to any of the above, SHOEBOX can help you. It's a complete system for managing time and expenses that's *really* easy to use. This SHOEBOX can hold and organize all those little scraps of information that turn so quickly into a hopeless jumble.

SHOEBOX provides unique features:

- **Appointments management**: An intelligent calendar that lets you plan your daily schedule, as far ahead as you like.
- **Reminders**: A separate, intelligent things-to-do list and tickler file—great for deadline items *and* recurring chores.
- **Expense recording**: Room for detailed entry of single or multiple expenditures connected with any appointment or reminder—including account, category and comments.
- **Recurring schedule items**: Put it in once, and it will reappear as many times as it needs to, no matter what the pattern of recurrence—whether it's the every-Tuesday meeting, a quarterly tax deadline or your mother-in-law's birthday.
- **Advance notice**: As much early warning of an item as you need.
- **Printed schedules**: Quick, hardcopy take-along schedules.
- **Expense Reports**: Detailed expense summaries for any period of time you select, organized by account or category.
- **Check-offs**: Mark reminders completed, or let the undone ones stay with you until they're cleared up.
- **Histories**: Recall all your past appointments or reminders involving a given person or subject.
- **Multiple-user**: Share your SHOEBO but retain privacy for your information with password protection.
- **One for all**: A single operator can coordinate schedules for many individu
- **Ease of use**: *No* knowledge of programming languages required... Single-keystroke commands... Lots of *on-screen* help for the new user... Help *always* available—never more than keystroke away...A User's Manual that' actually readable...Sensible defaults for data-entry options.

SHOEBOX offers a lot. What does it ask of you? Just an IBM Personal Computer (or compatible system) with 128K of memory, one floppy-diskette drive and, optionally, a printer that can put at least 80 characters on a line.

Suggested retail price is **$195**

SHOEBOX is a trademark of Techland Systems Inc. for its schedule-and-expense management software.

TECHLAND SYSTEMS INC.

39 Carwall Avenue Mount Vernon, NY 10552 (914) 699-8467

FIRST-CLASS OR BEARER SERVICE CARD

VER STORY/WINN L. ROSCH

xpensive devices are available to help protect ur files—and in some cases, your PC itself.

Block That Bolt, Hey!

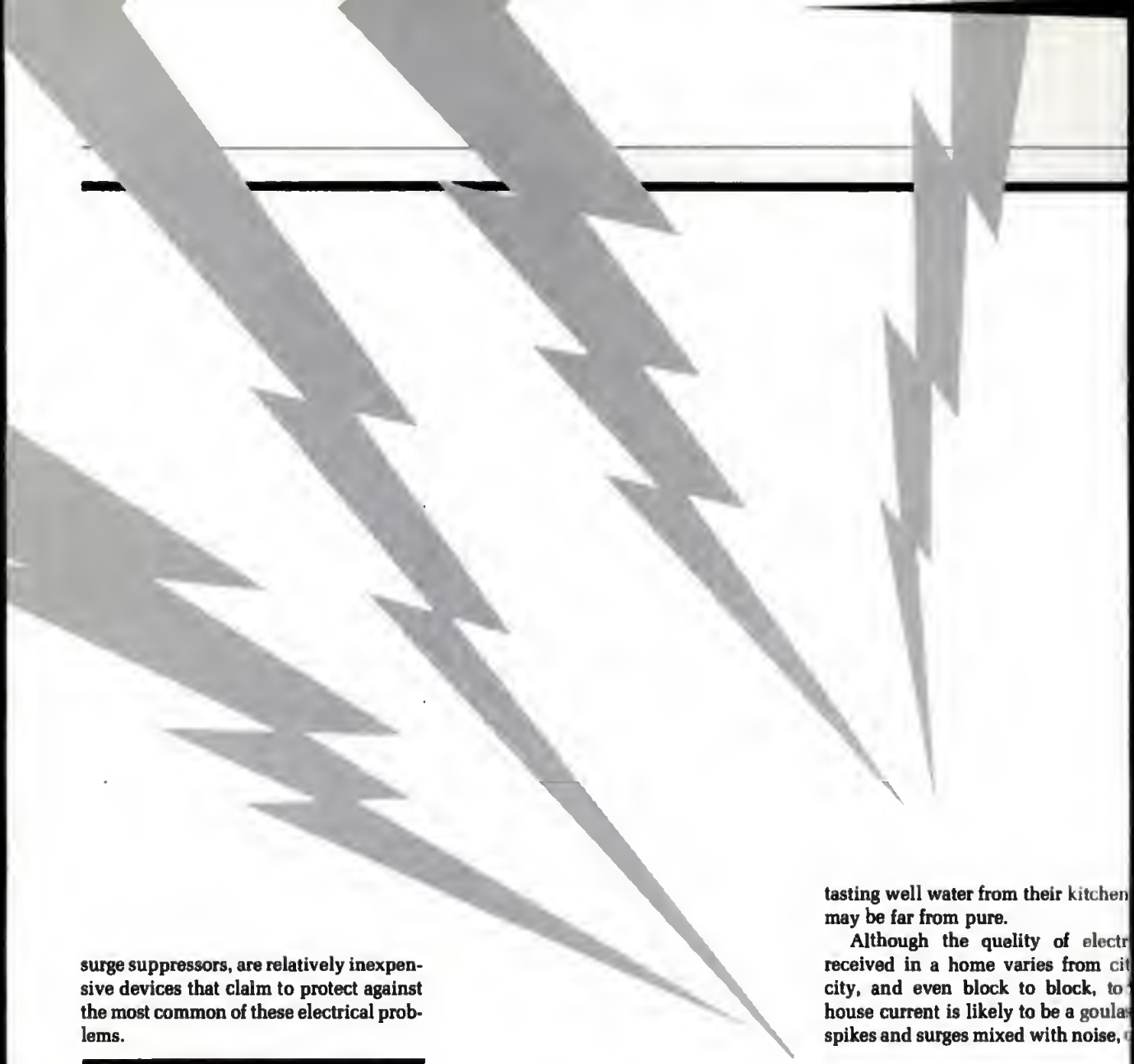
A direct hit by e bolt of lightning usually leads to severe consequences for the everege Personel Computer. When the smoke clears and the fire rtment has gone away, few PC owners would expect the data in the charred ins to be intact.

lost PC users don't realize that their puters are prey to similar, much more mon (though perhaps somewhet less taculer) destructive forces. Minieture es of lightning or abnormelly high ge pulses ("spikes") mey flesh into puters hundreds of times e day, hidwithin the "protective" plestic coetf the power cord.

Although few of these trensient pulses are powerful enough to zap e PC to oblivion, they and other power line-associated problems are estimated to cause nearly 70 to 90 percent of malfunctions in microprocessor-based equipment, including of course, the IBM PC.

These power line surges end spikes can cause a multitude of hardwere and softwere errors, renging from the troublesome to the expensive, from the misinterpretation of a single character or a gerbled file to a completely lifeless computer.

Power line conditioners are designed to minimize or eliminate computer problems that originate with the utility company-supplied line current. Two of these conditions in perticular, line filters and



surge suppressors, are relatively inexpensive devices that claim to protect against the most common of these electrical problems.

MOST PC users don't realize that their computers are prey to common destructive forces.

Despite certain similarities, the two are actually quite different, though equally confusing. Claims for both range from the modest to the miraculous, and choosing a particular unit—or whether to buy one at all—is perplexing at best and may seem impossible.

In effect, both line filters and surge suppressors act as insurance policies. As with insurance, deciding whether they are necessary or desirable requires an understanding of both the problem they are supposed to protect against and its consequences, and then comparing the various alternative solutions available.

Power Line Problems

In today's civilized and computerized world, much is taken for granted. For instance, most people assume that the sun will rise tomorrow, that the Personal Computer will make life easier, and that the electricity from the wall outlet is exactly the perfect portion for the appetite of the PC. Learning that any of these assumptions may be wrong inevitably comes as a shock (as it may tomorrow morning).

For most computer users, the biggest shock may come from discovering that plain household electricity, like the even-

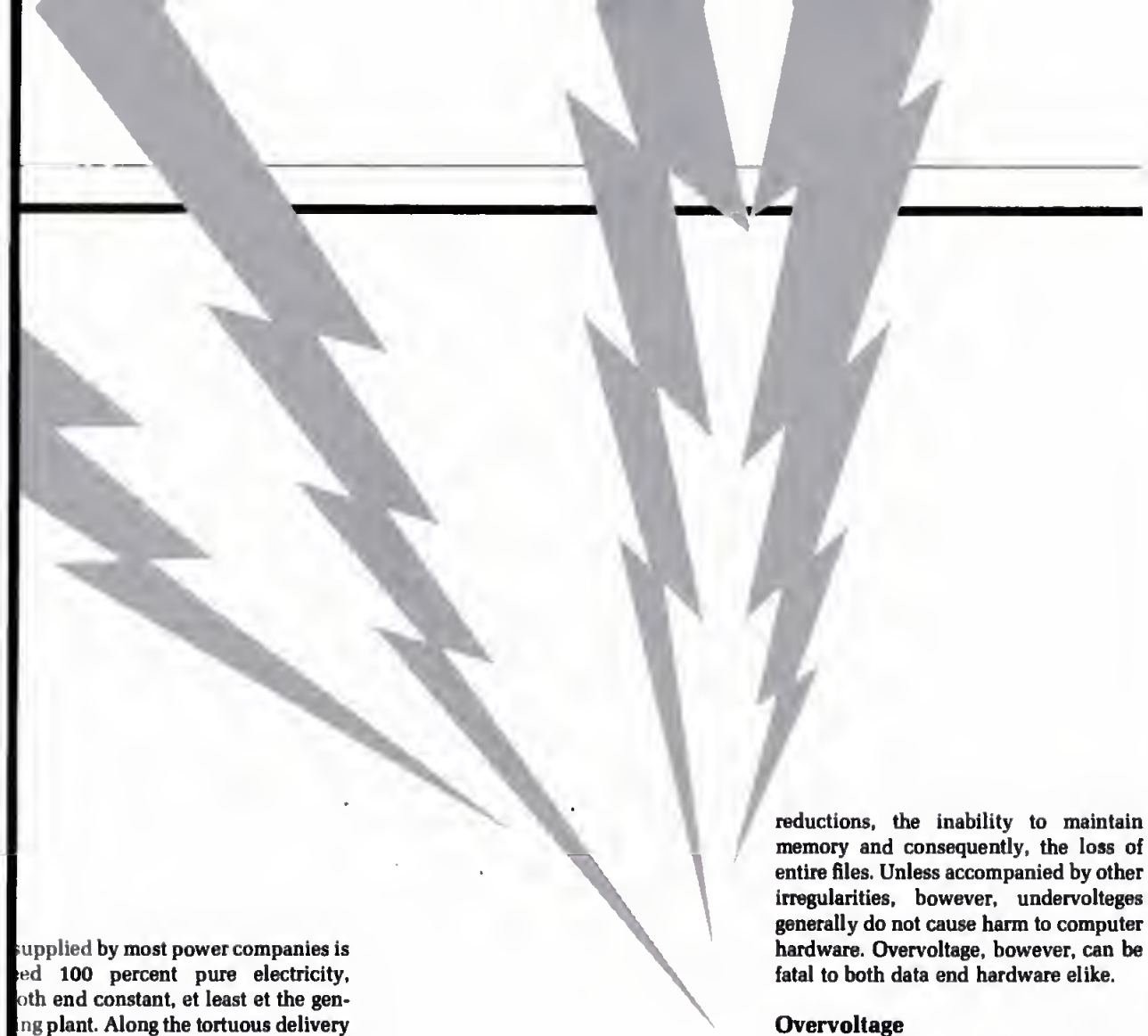
tasting well water from their kitchen may be far from pure.

Although the quality of electr received in a home varies from cit city, and even block to block, to house current is likely to be a goula spikes and surges mixed with noise,

POWER line-associated problems are estimat to cause nearly 70 to percent of malfunctio in the IBM PC.

end interruptions. Invisible and u ceived, these aberrations sneak d power line and electric cord alike. Sh precautions be neglected, they can into your PC and wreak havoc.

In fairness to the public utilitie must be admitted that the original p



supplied by most power companies is ed 100 percent pure electricity, oth end constant, et least et the gen- ng plant. Along the tortuous delivery e, bowever, the fresh-from-the-gener- current can run astray or become pol- d from extra signals. Power line pol- n can be divided into three catego- undervoltage, overvoltage, and e.

dervoltage

Undervoltage is just what its neme lies, less than the nominal 120 volts everyone assumes to be in the wires. most noticeeble undervoltege condi- is, of course, a complete lack of elec- ty, e blackout or power failure. sed by anything from the failure of a erating plant or downed power line to unpaid light bill, e complete power ure can last from a fraction of a second he arrival of the next paycheck. ough e complete power outage usual- oes not burt computer hardware, an rruption only a fraction of a second inevitably causes whatever is in tile RAM to be lost.

A more subtle undervoltage condition e brownout, a temporary reduction in voltage. Brownouts mey be purpose- ly caused by a utility to reduce the emount of power availeble to its custom- ers, or inadvertently when power demand exceeds generating capacity. Shorter term brownouts or voltage drops are often called "dips" or "sags," and usually result from a sudden heavy loed being switched onto the power line.

Although power companies have regu- lators that constantly adjust voltage to an optimum level, they take time to detect voltage irregularities and react. During the reaction period, e sag results.

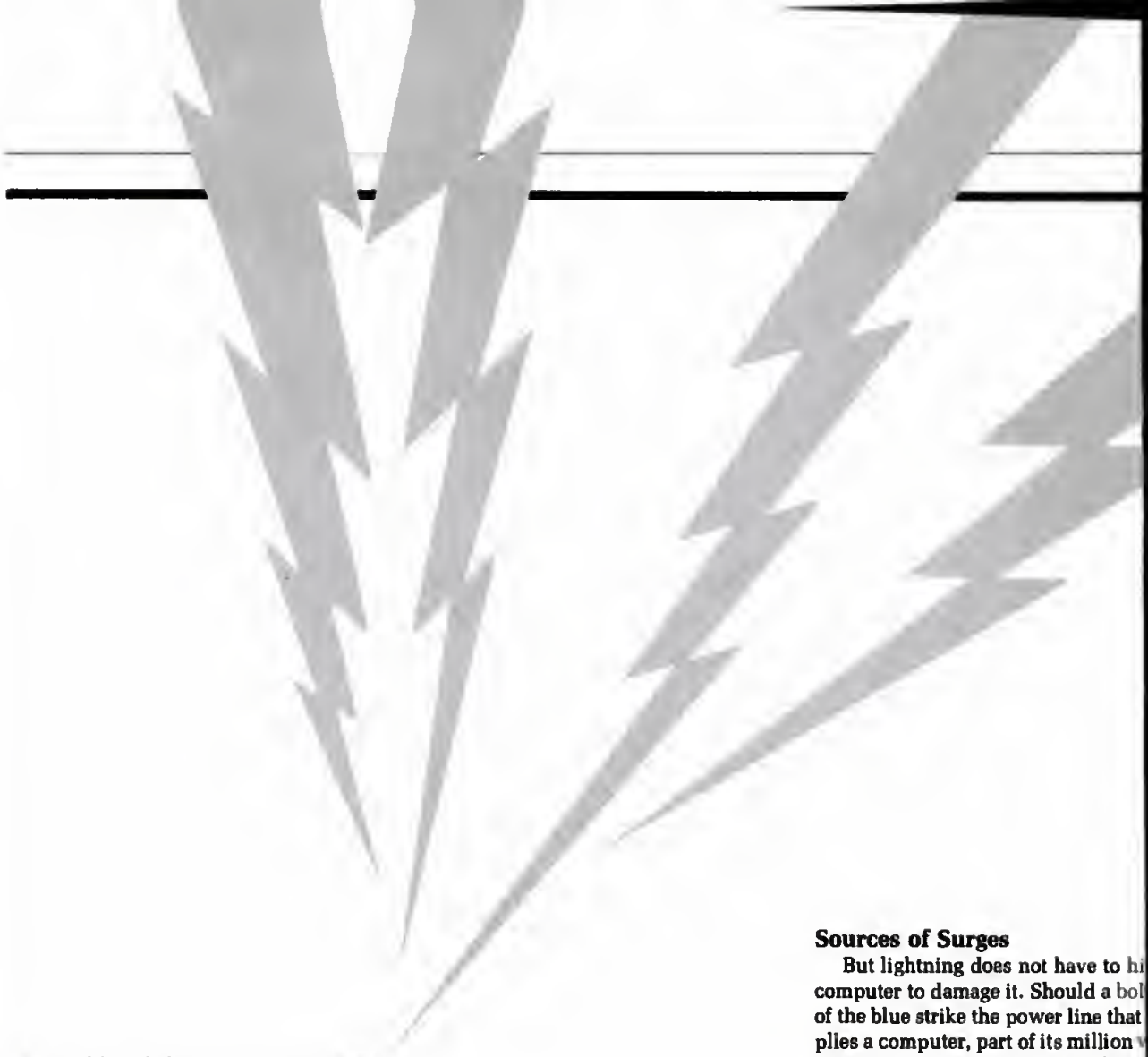
If the voltage drop from e brownout or sag is not very great, typically less than 10 percent, the power supplies built lnto most electronic equlpment, including the IBM PC, compensate by using their own internal voltage regulators.

However, when the line voltage drop ls more than the lnternal regulator of the equipment can handle, erretic operation may result. In a computer system, this can mean garbled entries or, during severe reductions, the inability to maintain memory and consequently, the loss of entire files. Unless accompanied by other irregularities, bowever, undervolteges generally do not cause harm to computer hardware. Overvoltage, bowever, can be fatal to both data end hardware elike.

Overvoltage

Overvoltage ls simply more potential, or voltage, in the power line than is nor- mally supplied; in other words, more than 120 volts at wall outlets. In the long run, utility company voltage regulators keep line voltage near its nominal velue, easily within 10 percent, close enough that the internal regulators of most elec- tronic gear can hendle the fluctuetions. By their nature, however, utility company voltage regulators make changes only over the long term (in the world of elec- tricity, the "long term" means seconds) because of the time it takes for them to detect a variation and correct for it.

BOTH LINE filters and surge suppressors act as insurance policies.



Hence, although long-term overvoltages greater than 10 percent are rare, overvoltage irregularities lasting less than one half cycle—1/120 of e second—occur frequently, and they can be destructive to both data and equipment.

ALONG THE tortuous delivery route, the fresh-from-the-generator current can become polluted from extra signals.

Some short-term overvoltages reach 6000 volts and peaks as high as 25,000 volts have been measured. The shortest of these overvoltages are often called "spikes" or "transients," and typically last less than a microsecond (one millionth of e second) and perhaps less than a nanosecond (one billionth of e second).

Longer overvoltages are often called "surges." Together, spikes and surges can be the greatest threat to your IBM PC outside of a 4-year-old child with a jelly sandwich aimed for the disk drive slot.

High voltage transients prlmarily arise from two causes: natural events and lnductive load switching. The most dramatic natural event, lightning, is nothing more than a gient electrical pulse or transient. No doubt, a direct hit by a stroke of lightning is one overvoltage condition most Personal Computers will not survive.

Sources of Surges

But lightning does not have to hi computer to damage it. Should a bol of the blue strike the power line that plies a computer, part of its million v of energy may be routed down the p line. Nor need the lightning even t

UNDERVOLTA generally does not ca harm to computer hardware.

the wires directly. It can induce ten thousands of volts into wires simpl flashing near them.

Inductive load switching ca spikes and surges by instantly releas large amount of electrical energy that stored in a magnetic field. Energizi magnetic field in the coils of wire ins motor or transformer actually stores trical energy. When the device switched off and the magnetic field lapses, all of this stored energy is inst ly released but has no place to go o

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then beck down the power line. The resuit is a giant voltege pulse thet radiates throughout the power system until it spreads itself too thin to be noticed or until it is absorbed by some devlce. Woe unto the poor Personal Computer that it finds first.

OVERVOLTAGE can be fatal to both data and hardware alike.

Overvoltege spikes end surges are harmful to electronic equipment for several reasons. The filter circuits in computer power supplies may let transients pass through almost unimpeded, end the resulting pulse now inside the computer itself may be misteken for a pulse of dete.

Essentially, all wires ect like smell transmitting and receiving entennee; the power cord broadcasts the spike and the wires carrying data lnside the computer receive it. Consequently, even when the power supply filters stop a pulse from directly lnveding the computer circuitry, the pulse may be "capacitiveiy coupied" into other wlres. The result is errors in the data. Further, pulses that sneak through the power supply or are capecitively coupled can be so powerful thet they demege the circuitry inside the computer. Or they may destroy the computer power supply ltself, leading to an out-of-servlce computer and a hefty repair bill.

In any given power system, switching trensients may be created many times a day when an electric power company reroutes feed lines serving the utility grid. On a smaller scale but just es dangerous, such transients cen be creeted within the confines of a home when a motor—say the refrigeretor or air conditioner—starts or stops.

There is no sefety or escepe from spikes and surges. Although transients that travel long distances are dissipated by the resistance of the wire in the power grid—which means the farther you are from your utility substation, the safer your PC is—greeter stretches of wire are more susceptible to neturel phenomene, like lightning.

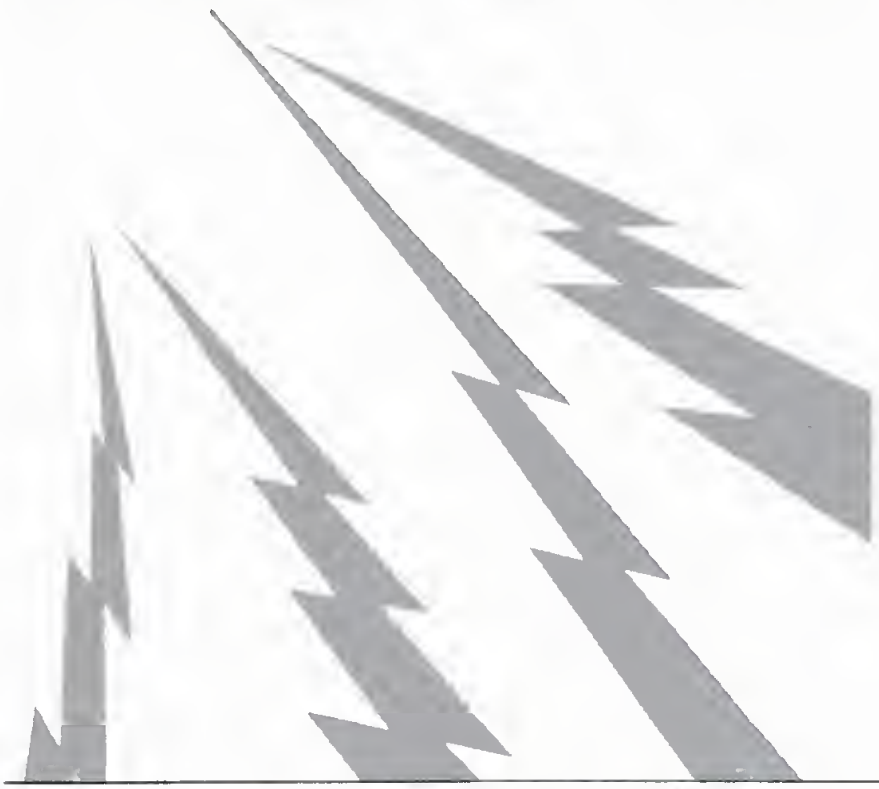
Computer users in Manhattan may be reletively safe from netural transients. Because their power lines are mostly short end underground, they are pro switching trensients from nearby su tions. In Breadbasket, Iowa, how where the nearest substetion is s where over the edge of the earth, ligh is e bigger threet.

Should you try to avoid the tren problem entirely by buildlng your power station, say a 40-megawatt v mill, your PC would still be susceptil transients created by eppliances w your own home.

Noise

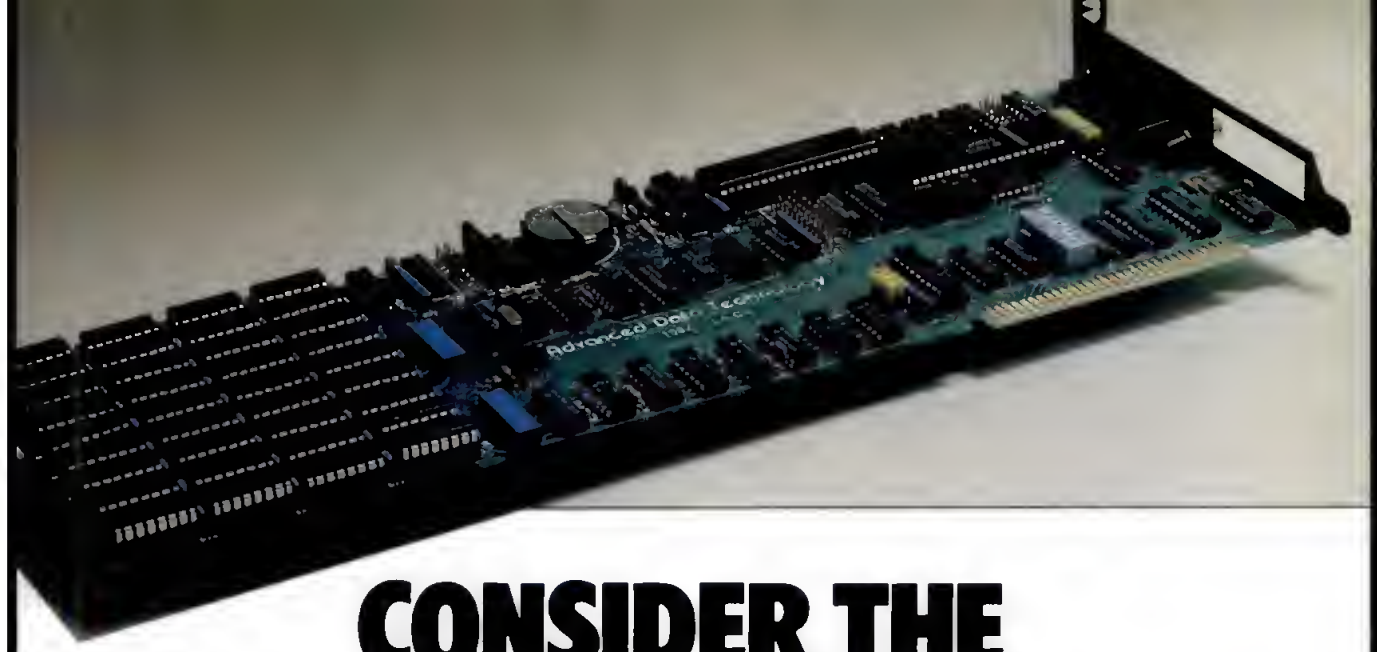
Noise is elso a signal. It can affec normel electrical signal in the su wires. The dividing line between and surges can be tenuous. Strictly s ing, lightning is a noise source induces spikes in power lines. In ge however, noise signals are of a much er level then either spikes or surges. are usually in the volt, rather than volt range and may be periodic, peaks occurring up to millions of ti second.

SPIKES AND surges can be the greatest threat to yo IBM PC outside of a year-old child with jelly sandwich aime for the disk drive sl



The most common source of no electromagnetic lnterference or (more often described as radio frequ interference (RFI), which is essen errant broadcast of communication nals and electromagnetic pulse (E whlch consists of lightning, eutom ignition noise, or power line spikes radiate energy from the wires. Ju spikes end surges could be cou inside the computer, power lines ac receiving entennae, plucking other, i fering signels out of the air. Technic these noise voltages are "induced" the wires.

Common sources of interferenc



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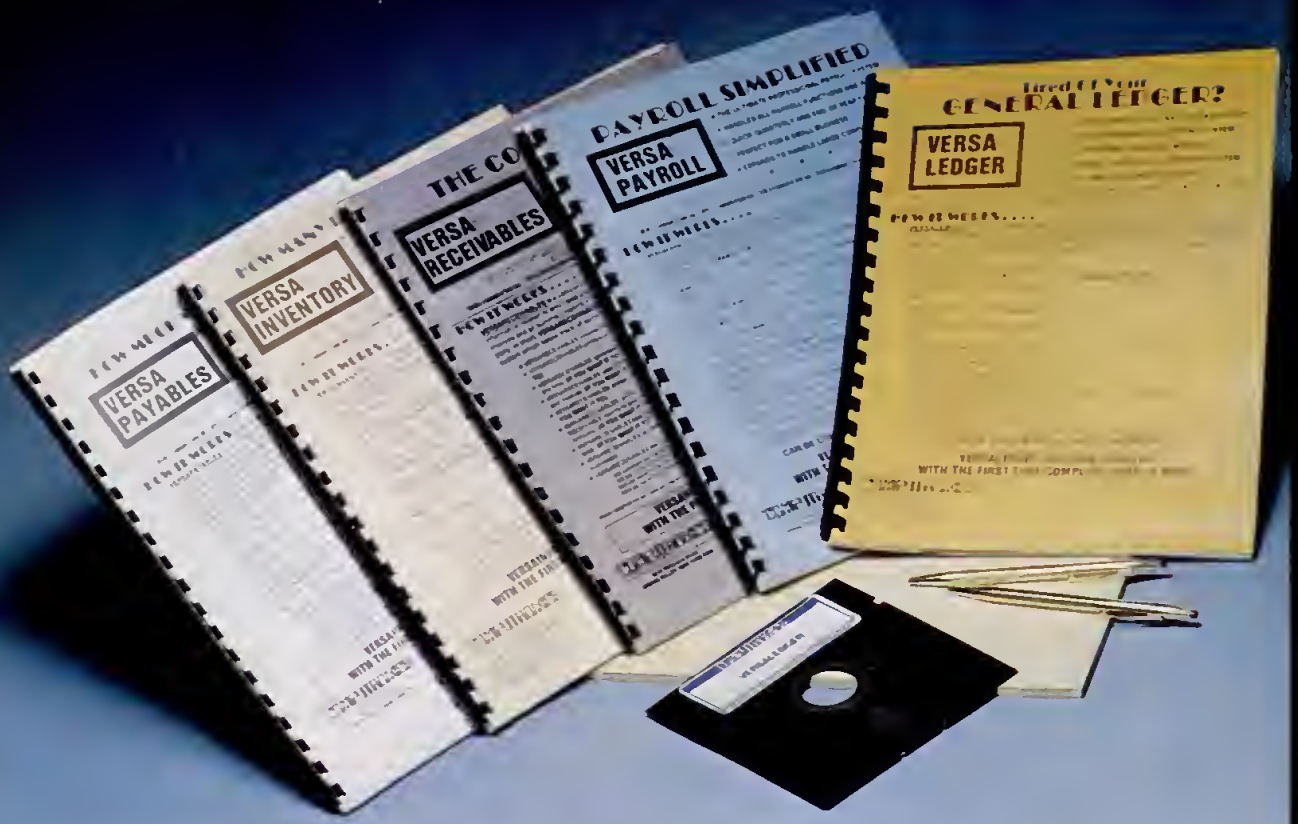

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›wer Line Conditioners: Line Filters d Surge Suppressors

ırce: Manufacturers' literature)

ker	Model	Type	Cost	Comments
sta Systems, Inc. 3440 Roberto Court San Luis Obispo, CA 93401 (805) 541-4160	Voltage suppressor	Surga suppressor	$29.95	Other protection devices also available.
narc Industries Inc. 21 Governor's Court Baltimore, MD 21207 (800) 638-9098 (301) 298-2629	C-120 Q Clipper	Surge suppressor	Contact manufacturer	Transient protected line cord, parallel typa, three outlets.
	CS-15-6	Surge suppressor	Contact manufacturer	Six-outlet strip with switch and circuit breaker.
	DP-1102	Regulator and Surge suppressor	Contact manufacturer	Two outlets in metal box, 9-inch cord, 200 VA.
	DP-1105	Surge suppressor	Contact manufacturer	Four outlets, 500 VA. All models: response time, under 5 nanoseconds; clamping voltage, 160 V; handles 4.5-kw surges, 15 A. loads. Othar models available.
tronic Protection Devices Division CNS Electronics Corp. 5-9 Central Ave. Waltham, MA 02154 (800) 343-1813	Lemon	Surga suppressor	$ 59.95	Mounts on wall outlet, gives six outlets.
	Lime	Surge suppressor	$ 89.50	4.5-foot cord, switch, six outlets.
	Peach	Noise filter and Surge suppressor	$ 97.50	Mounts on wall outlet, gives three sockets.
	Orange	Noise filter and Surge suppressor	$139.95	4.5-foot cord, switch, six sockats. All models: response time under 5 nanoseconds, handles 10.8-kw surges, 15-A loads.

mpere, kw=kilowatt, V=volt, VA=volt ampere

rical motors, particularly high-pow- ones, automobile ignition systems, the CB radio operator down the t.

oise on the power line can creep into electrical device. You will most like- otice it on the home hi-fi system or ision set, the whirr as the refrigerator the steady clackety-clack as the nbor tunes up his '53 Studebaker, the stuff-the-kids'-ears-full-of-cotton uage that erupts when the CB enthu- warms up his kilowatt linear ampli-

kewise, the same noise signals can nto computer systems by slipping igh the power supply circuits or being coupled around it, but there is a big difference. Instead of making sound from the noise, the computer is likely to confuse its pulses with data. The result can be garbage on the CRT and errors piled into files.

LIGHTNING does not have to hit the computer to damage it.

The IBM PC power supply circuitry eliminates most noise signals. Particularly strong noise signals, however, can get through.

Avoiding Power Line Problems

Although add-on devices that protect against any conceiveable power line-related problem are available, few of them are cost-effective for every computer user.

Because undervoltage problems are rare—estimated to account for only 2 percent of all power line problems—and by themselves usually won't cause permanent harm to computer hardware, expensive cure-all power conditioners called uninterruptible power supplies (UPS)

Power Line Conditioners: Line Filters and Surge Suppressors

(Source: Manufacturers' literature)

Maker	Model	Type	Cost	Comments
Electronic Specialists, Inc. 171 South Main St. Natick, MA 07160 (800) 225-4876 (orders) (617) 655-1532	iSO-1	Noise Filter end Surge suppressor	$ 69.95	6-foot cord; three outlets; handles 4500-watt surges. 18 watt loads; optional circuit breaker and light.
	ISO-3	Noise Filter and Surge suppressor	$104.95	Similer to ebove but handles to 6500-watt surges.
	AC-SFK-335	Noise Filter and Surge suppressor	$ 59.59	Mexlmum load of 1250 watts more models availabla.
Isoreg Corporation 410 Great Road Littleton, MA 01460 (617) 486-9483	16-025-12-12-12-2-UU	See "Comments"	Contact menufecturer	250 VA ferro-resonent regula surge suppressor; models fro 125 VA to 50,000 VA.
RKS Industries 4865 Scotts Velley Dr. Scotts Valley, CA 95066 (800) 892-1342 (408) 438-5760	SS-120 H	Surga suppressor	$ 89.50	Wall mounting, two outlets.
	SS-120 P	Surge suppressor	$ 69.50	Plugs into a terminai strip to protect ell outlets on strip.
	SS-120 M	Surge suppressor	$112.00	Systems model, six outlets. Ali models: 200-V clamping, response time, 5 picosec. Handles 4.5 kw surges. Many more models
Sun Research, Inc. Box 210 Old Bey Road New Durham, NH 03855 (603) 859-7110	MDS-150	Ferro-resonant voltaga reguiators and Surge suppressors	$90	150 watts
	MDS-250		$185	250 wetts
	MDS-600		$275	600 wetts
	MDS-1000		$500	1000 watts Other models availiable

A=Ampere, kw=kilowett, V=volt, VA=volt ampere

mey not be a good protection investment, particulariy in a home rather than business environment where losing data isn't especially tragic. UPS prices range from $2 to $5 per watt of power rating, severel hundred dollars for a unit to hendle ona IBM PC. Line filters, wbich give minimal protection from power line noisa, generelly cost as littla as a few dollars.

Surge suppressors, which protect against most potantially dameging spikas end surges, cost from about $20 to $100. Tha range in price roughly corresponds to the amount of protection they give. Be careful: Verious units are cellad "surge suppressors," but different devices use different designs, some of which are more effectiva than othars. Although tha terms "line filter" and "surge suppressor" are sometimes used interchengeebly, you should be eware of the difference because the wrong device can be fatal to your computer.

THERE IS no safety or escape from spikes and surges.

Most electronic circuit components conduct electricity of different frequencies differently. In perticular, capacitors conduct high frequencies better than frequencies, and inductors (or "chok conduct low frequencies better high. The right combination of induc and capacitors will favor 60 cycles ell other frequencies, letting line cur pass and stopping noise. In effect, su circuit "filters" out the noise, hence name "line filters." Lina filters by th selves, however, do not eliminete sp and surges.

The power hendling capacity of fi is smell. The ferrite inductors use some line filters can "saturate," bec overloaded with electricity, by the mendous power in a spike. Consequer much of the spike's energy gets thro Ovarvoltage energy can also whiz

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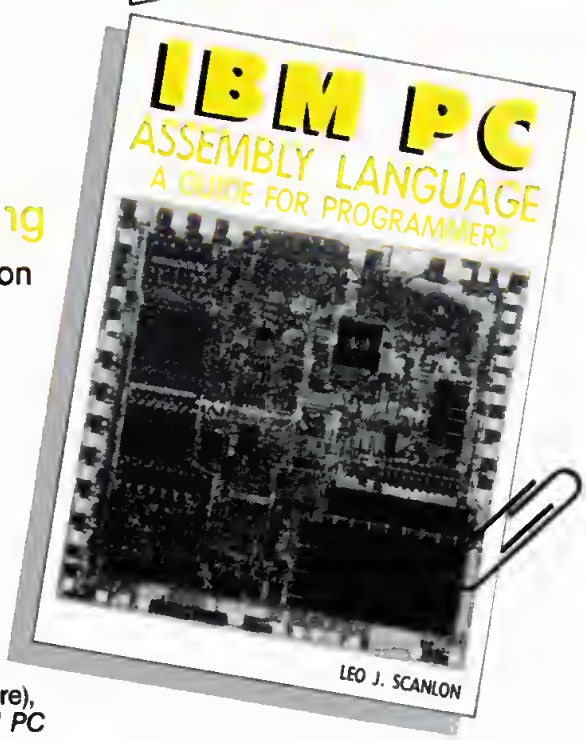

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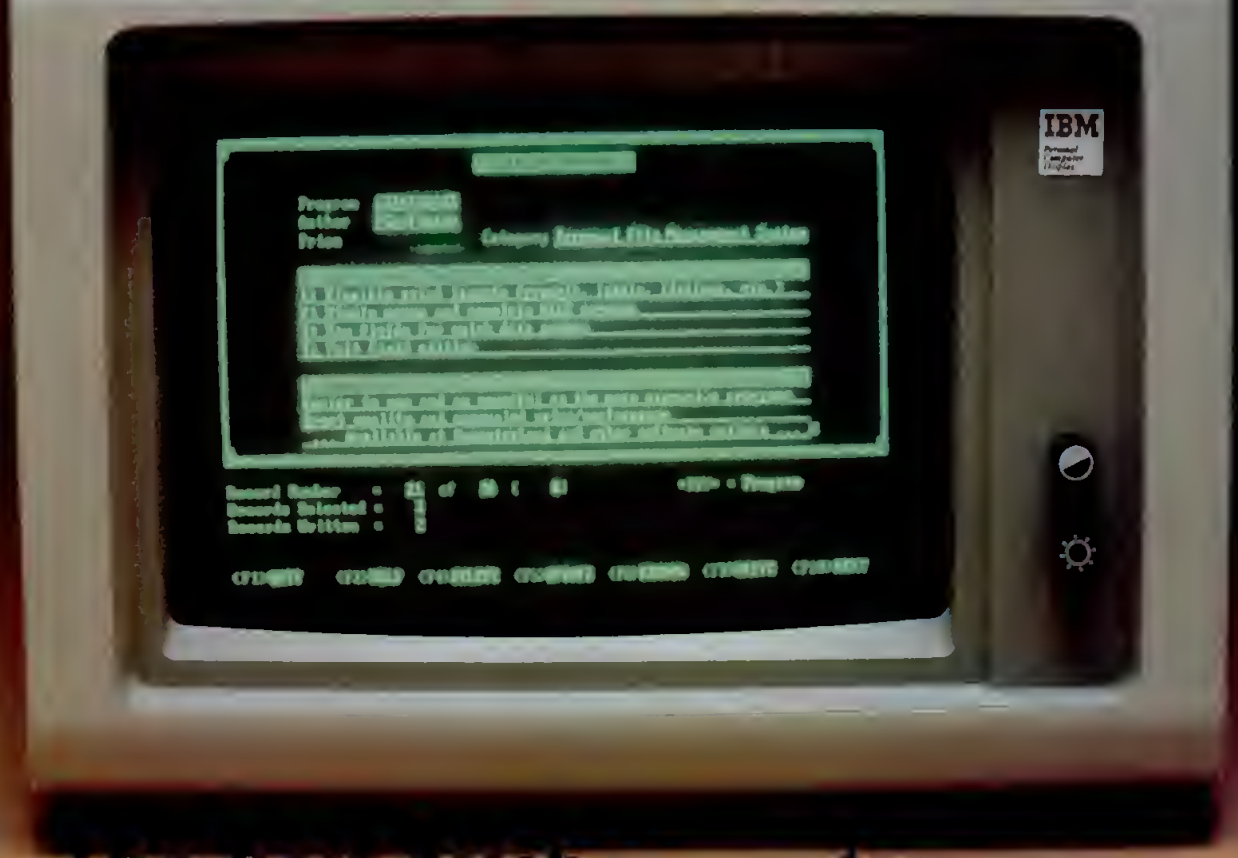

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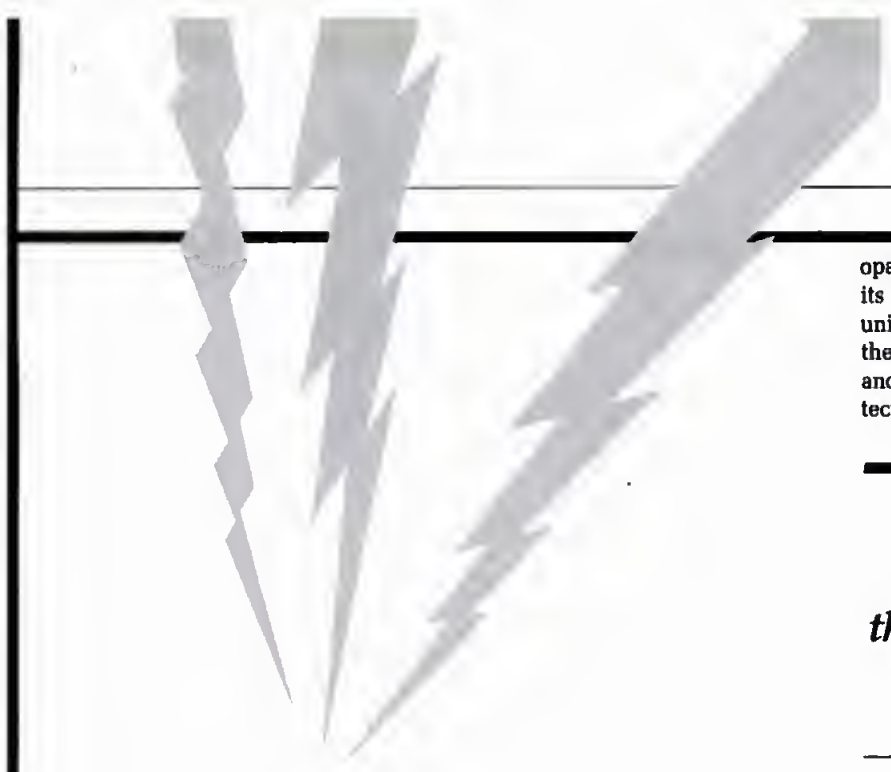

many filtering capacitors.

or greater protection, many surge pressors use special samiconductors conduct electricity only when the age ecross thair leads is greater than e n potantial. Whan a spike axceeds level, the overvoltege is clipped off. voltaga at whicb clipping begins is n celled "clamping voltaga." Note, ever, that these suppressors reduce er than eliminate spikes and surges. A safety margin must be provided veen normal opereting voltege end the ping voltage. In genaral, this safety gin is 100 percent, which maens, for ons known but to circuit designers God, that soma surge suppressors allow potentials es high as 600 volts k-to-peak to pass unimpedad. Better ge protectors heva lowar clemping ages—under 200 volts.

Another type of surge suppressor, usumore expansiva, usas a ferro-resonant sformer (parhaps in addition to other ns of protection), which is designed to w only normal 60 cycle electricity to s through it, absorbing any eberrations. As a side benefit, meny of these transformers store anough energy to "carry tha load," or oparata a computer, during a brief power interruption, usually limitad to ebout ½ cycle (1/120 of e second) long. The usafulnass of a surge protector is determined by two factors: how fest it works end how much energy it can handle.

Tha surga suppressor must reect in a period shortar than the length of the sbortest pulsa it is supposed to protect against. Therefore, when comparing the specifications of two diffarent models, generally a fester response time or clamping speed is better. Response times mey be es sbort as picoseconds—trillionths of a second!

The surge suppressor must be able to handla all tha power in en overvoltage pulse, which may be awasoma indeed. The larger the energy handling capacity, the better. Soma units claim to handle millions of watts.

Other Considerations

Sometimes power line protaction devices are classified as "series" or "parallel." A sarias davice absorbs the unwantad signal before it reaches the computar; e parallel device shorts out the potentielly-demeging signel. This diffarence is most apparent when e powar-line problem destroys the protection device itself—an unlikaly occurrence—but it can heppen).

A daad series-type unit will no longar oparata a computer, and tharefore makes its condition apparent; a dead parallel unit will run the computar, but you might then be unaware that the davice hes failed and that you consequently bava no protection.

NOISE ON the power line can creep into any electrical device.

On tha more practicel side, depending on its dasign, a saries filter might not protect its multipla outlats from interfering with one another. A printer plugged into one of tha outlets on a serias filtar mey genarata spikas that could be passed to a computer using enother outlet on tha sama filtar box. Most parallel davicas are not susceptibla to such intaraction.

(Line filters may be series or parallel; semiconductor surge suppressors are usuelly parallel; and farro-resonant surge protactors ere series or, more often, a combinetion of both.)

Sbould you get out e screwdriver end open up one of the commercially-available lina filtars or surga suppressors to see whet's inside, you may be disappointed indeed. Many contein but a faw cheap parts. If you wanted to, you could buy the same electronic components and install them insida your computer yourself.

This is not a good idea for a couple of reasons. Soldering insida your IBM PC will void the warranty, and if you don't know what you're doing you're inviting disastar. Besides, your tima is valuable. Remember: You bought the computer to seva your time. Once you add in the cost of that time for the labor of instelling the parts, tha factory-mada units are e bargain indeed.

Line conditioners thet are approvad by Underwriters' Laboratory (UL) essure you protection thet is safe to install and use.

Using any commarciel surge suppressor or line filter is easy—just plug it into a wall outlat, and plug your computer into it. Nearly any of them can be good insurance for your computer investment. */PC*

SOLDERING inside your IBM PC ill void the warranty.

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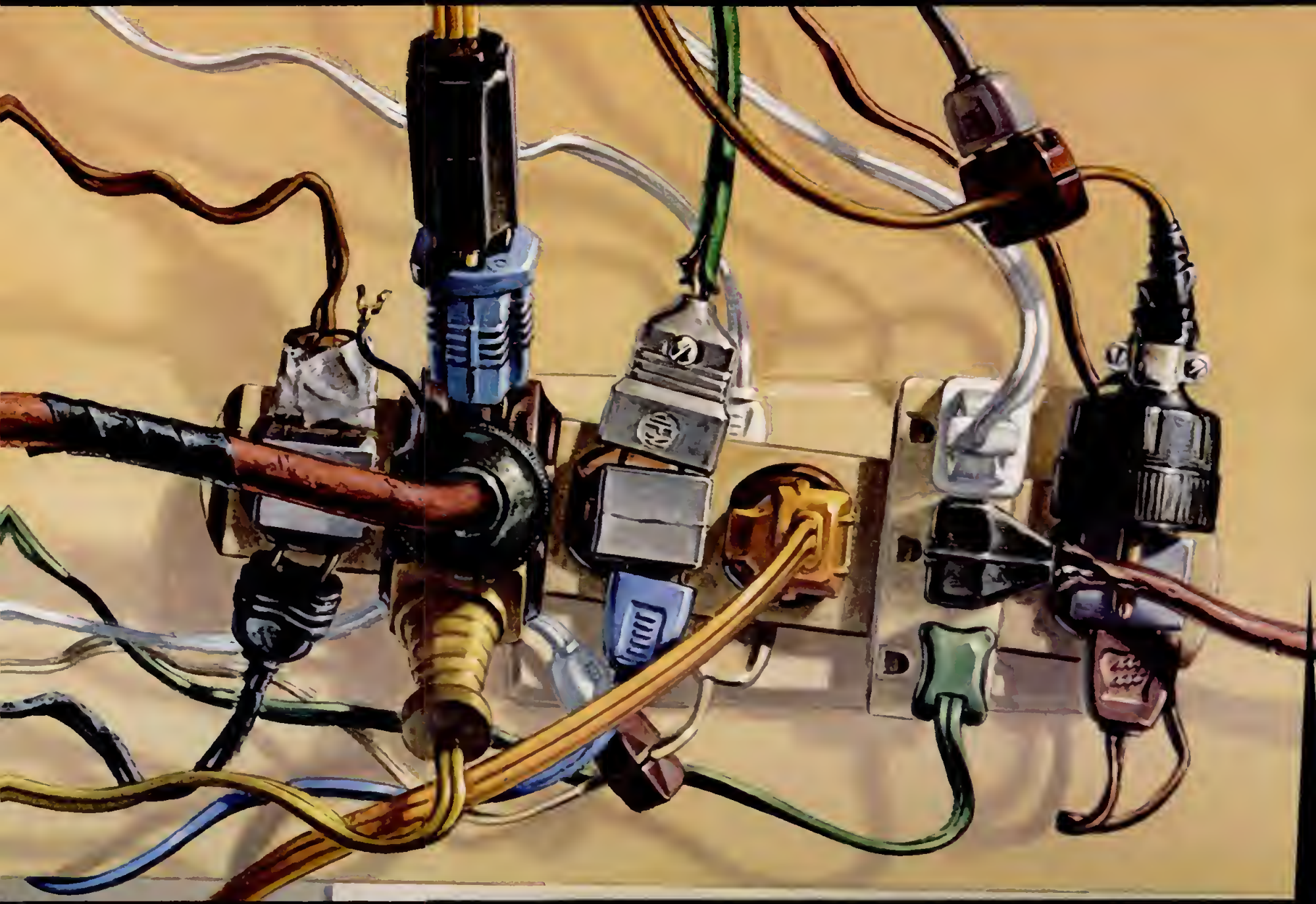


VVER STORY/WINN L. ROSCH

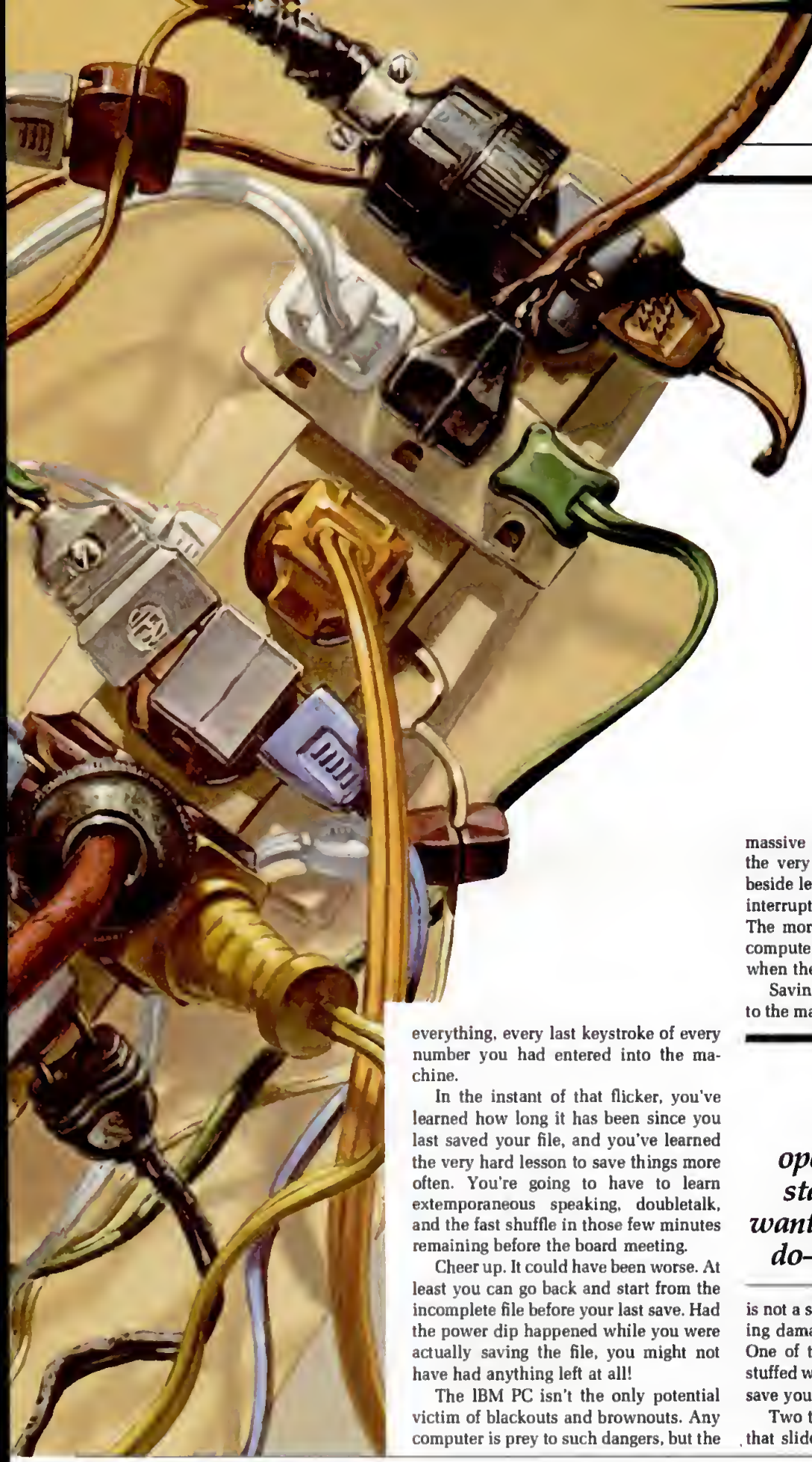
xwer dips and blackouts are the biggest nemesis to mputer users. With the right equipment, you can p assure continuous power to your PC, even sen the lights have gone out all around you.

Living With Lapses In Your Power Line

No doubt now about why you invested in an IBM PC with that extra half-megabyte of memory. You're buzzing through a spreadsheet the oof Connecticut, analyzing the compe- m down to the tiniest fraction of a yen. dboard meeting is in half an hour, and answers to every last question your seagues will throw at you are locked in multi-columns.

You pause for a second in a daydream of raises and promotions, but in a wink, you're awakened by the chirp of the computer. The screen is lit, obediently awaiting your next command, but the spreadsheet is gone! The operating system is staring at you and wants to know what to do—and so do you!

It wasn't a blink but a flicker, a power line dip or shutdown only a fraction of a second long, yet long enough to wipe out



everything, every last keystroke of every number you had entered into the machine.

In the instant of that flicker, you've learned how long it has been since you last saved your file, and you've learned the very hard lesson to save things more often. You're going to have to learn extemporaneous speaking, doubletalk, and the fast shuffle in those few minutes remaining before the board meeting.

Cheer up. It could have been worse. At least you can go back and start from the incomplete file before your last save. Had the power dip happened while you were actually saving the file, you might not have had anything left at all!

The IBM PC isn't the only potential victim of blackouts and brownouts. Any computer is prey to such dangers, but the

massive memory capabilities of the
the very same ones that make it s
beside lesser machines, also make p
interruptions and dips more expen
The more volatile solid-state memo
computer has, the more it stands to
when the lights go out.

Saving files more often, writing t
to the magnetic security of disk mem

THE operating system is staring at you and wants to know what do—and so do you

is not a solution but a means of mini
ing damage. It's also counterproduct
One of the reasons your computer
stuffed with an oversupply of RAM w
save your precious time.

Two types of add-on devices and
that slides into an expansion slot in

PC chassis are touted as saviors from power line-inducad sacrifica of RAM: age regulators, uninterruptibla power ems, and add-on CMOS mamories. threa diffar considerably in the pro- on they provida, how it's achieved, most particularly, cost.

The first two can be espacially confus- to the electronically innocent. More- , the devlces in each class vary con- rably in affectivaness. Soma giva

THE MORE volatile solid-state memory a computer as, the more it stands o lose when the lights go out.

plete protection from nearly any ar lina related problam; others offar nore protection than already avallabla in the IBM PC.

tling Brownouts

Tha dasignars of electronic davicas me that thay will be oparated under ain conditions, the first of which is an quata continuous supply of alectricity given quality. Voltagas exceedlng tha st-casa expectations of the dasignar damaga your PC. Voltagas below tha ectad leval may impair its function. If voltage supplied to a computer ever s balow the minimum, the PC may not bla to maintain its mamory.

Although noisa filters and surge sup- ssors can and do improva the quality tility company-supplied electricity by inating power line garbaga, they can- handla undarvoltage conditions, and are designed to cope with long-tarm rvoltagas. Howevar, as thair nama lias, voltage regulators ara dasignad gulata or control tha voltaga supplled electronic (and other) equipment, ping its lavel as near to the optimum ossible. Whan the power line voltaga s, tha voltage regulator "cranks" the l back up; when tha lina voltage risas, anks its output back down so that the puter (or other devica) attached to the regulator recaivas a constant voltage.

Of coursa, voltaga regulators are nothing new or unusual. Utility companias hava usad tham for decadas throughout thair power grids to keep the electricity thay supply at tha proper level. The regulators that the utilities use are huga davlcas that consist of larga transformars with a numbar of "taps" or "windings," outputs set at different voltaga levels. Motors operata a series of switches that select the taps supplying the most appropriata voltage.

Although smaller versions of thesa mechanical regulators are availabla for businass and industrial users, faw are usad in conjunction with personal computers. A "small" mechanical regulator may still be many times larger than you would nead. Being mechanical, thay are slow, perhaps allowing voltage to dip long anough for data to ba lost. Baing mechanical means thay avantually waar out, too, and their straightforward design offars no protection from noise and transients.

Anothar styla of voltaga regulator that shares thase problems usas a motor to rotata tha shaft of a variabla autotransformar (a single-winding transformer with an adjustable output voltage.)

Electronic Alternative

Some of the problems of the mechanical regulator are overcome when solid-state alectronics are appliad to tha tap-switching concapt. Instead of mechanical switching, thay can ba switchad electronlcally using high-powar transistors or thyristors. Tha resulting davices hava fastar reaction times than their mechanical brethren and are not subject to wear. Whila thay do giva protection against dips and long-term ovarvoltages, such regulators still offar no protaction against transients and noise.

The most commonly availabla (affordable) home-siza units basad on tha tap-switching concapt work by manipulating tha magnatic fiald lnside a specially-dasigned transformer. A "saturabla reactor" regulator appllas a DC control voltage to an extra control coil on the transformer. By "saturating" the transformar core, it prevants the output voltaga from excaading a presat lavel. (A saturatad transformer is oparating at its capacity.) The DC control current is determined by sampling the output of tha ragulator and adjusting it until tha output is at the proper leval.

Compensation for low voltaga conditions can be achieved by applying enough DC control voltaga to keep tha transformer saturated to levels well below the lowast expectad. It's a simple solution, but that constant application of axtra power means that such ragulators are lnafficient; thay taka in much more power than thay put out. Nor does such a regulator give protectlon from noise or transients.

Othar common add-on voltage regulators may usa a "ferroresonant" transformer, which is "tuned" into saturation much lika a radio is tuned, by a capacltor ln conjunction with an extra winding. Tuning makas the transformer favor one output state over all others so that it naturally resists any change in its output, aithar a change in voltage or in frequancy. A ferroresonant transformer not only regulates current, but also suppressas voltage spikes and reducas line noise.

More elaborate regulators, like those manufactured by Isoreg Corporation, rely on similar principlas but add furthar protection with additional shialding and othar forms of built-in transiant limiting. Any voltage regulator, however, has a limit to how much and how closely it can regulata.

NOISE filters and surge suppressors cannot handle undervoltage conditions.

The term "regulation" itself refers to how naar to the desirad voltage tha regulator maintains its output. Oftan, this is axpressed for a given variatlon ln input voltaga: Output voltage will not vary more than 1 percant for a 10 parcent (or 1 volt for a 10 volt) change at the input.

The input voltaga range of a regulator indicates the maximum variation that can be compansatad for. It should be greater than or aqual to tha voltaga variation axpectad at tha outlat the computer will be plugged into.

The PC After Dark

As it comes from the factory, tha PC is designed to handla voltage dips of 20 percent without flinching and excessas to 15 percant without damage. in fact, even when brownouts darken the screan, there is still a safety margin to ansura that tha data stored in RAM stay intact.

Tha angineers at iBM feel that tha lnput voltage tolarance of the PC is wide enough to handle typical fluctuations encountered in most operating situations. However, If your experience contradicts their sanguina expectations, be sura to lnvestigate regulators with a wider range than that of the PC itself!

Every voltage regulator has a power rating in addition to tha figures given for regulation. Tha power rating indicates the maximum load the regulator can handla wlthln lts specifications. Tha IBM PC carries a nominal rating of 200 watts, indicating that the minimum power rating required of a voltage regulator to handie it should ba 200 watts (or 200 VA, volt-amperes). Computer-quality voltage regulators capabla of handling the PC car be purchased for $200 to $300.

Internal Power Failure Protection

Voltaga regulators cannot regulata voltage that isn't there. Although effective for brownouts, a regulator offers no salvation in case of complete power outages—blackouts—that last longar than a fraction of a second. Compared to tha rast of the world, American utilities do an excellent job of delivering a continuous supply of electricity, but no utility can guarantee that its service will be free from interruptions. When the standard sources cannot supply what you need, you are forced to look alsewhere.

In the case of electricity, another sourca is not a bad idaa. Tha best way to avoid all power lina-associatad problems is to avoid using the powar line at Alternate energy solutions abound thase post-energy crisis timas: solar p er, windmills, oil shale, magnetohy dynamics. Any of them can be adapte

THE PC is designed to handle voltage dips of 20 percent without flinching and excesses 15 percent without damage.

run a homa or businass or its compu But bafore you run out and negotia home fusion reactor, taka nota that ene independenca is still expansive, and probably remain that way. Naverthel thare is a common altarnativa to line rent—battarias.

A straightforward solution to po lina problams is to run failure-sensi equipmant directly from a battary sup in fact, antire telephona exchanges their umbilical cords to rooms lined v laad-acid batterias to guarantee conti ous service. Tha ambitious and inven PC user could lash together enough D cells to run his computer without fea glitchas and dips.

Unfortunataly, tha IBM PC was designad to be aspecially frugal in power consumption dapartment. If opt for Duracalls, you may end up cha ing your doubla-A's more often than year-old's diapars.

Tha iBM PC as it comes from the tory in its corrugatad whita shipping ton is not to use anergy sparingly, add-on RAM systam for the PC will h raduca its appatita.

Tha standard iBM PC RAM mam tha ona subject to data loss due to po failure, ls mada with NMOS technol NMOS describes the fabrication tech ogy and oparating concapt of tha lnteg ad circuit cbips.

iBM, lika most other computar m ars, chosa to usa NMOS chips beca they are fast, compact, easy to des with, and relativaly inexpensiva.

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ıtegratad circuit chips using other nologies ere also aveilabla. One, ɜd CMOS (Complementary Metal Ox- Semiconductor), offers an important ıntage: When it isn't thinking, it .ires extremely little power, much than a comparative NMOS memory. ny battary can keep its memory fresh ı year or more.

lecause it takes up more real estete on ɔrinted circuit boerds, might not ba as ıdy as NMOS in meny applications, can be very costly, CMOS is not used nost memory boards for the PC made BM or outside suppliers. When it is l, capecity is limited to a fraction of t would be available with NMOS ıs.

lowever, speciel CMOS memory ·ds are available with a built-in bet- that mekes them independent of line ar. When such boards are installed implamantad properly, the deta or ;ram instructions held inside them ain intact during blackouts, when the ; is accidentelly pulled, and even n you turn off the PC.

)ne such memory board is currently lable from Tecmar, Inc. Callad "For- ſeNot," it features a 32-kilobyte ce- ty and slides directly into one PC ınsion slot. List price is $995.

ılthough an elternete memory board ects data, it does not protect the PC f from spikas, surges, and all tha other ıons on the power line. In fect, it is es ıarabla as any other solid-state cir- ry to the vageries of the utility compa- nd still requires a saparete surge pro- ɔr when your PC is opereted from tric supplias of doubtful quelity.

nputing by Candlelight

ılthough the PC won't run directly ı a battary supply, DC battery voltege be converted to AC and boosted to the nel electric requirement of the com- ɜr. A device callad an inverter does trick.

ın IBM PC system can run off e com- ıtion of a car battary and an invertar, there can be problems with such a pla arrangament; whan the battery ; out of life, so does PC memory. Also, ıss a more expensive "sine wave" out- ls specifiad for tha inverters, the out- of the invarter may be "square wave" tricity, which can cause computers ıre Indigestion. Oftan, square wave outputs of inexpensive powar inverters are supplied fully-equipped with glitches and spikas, suiteble for electric drills but not fussy computers. You can avoid both of these problems.

A sine weva output inverter dalivars alectriclty exactly like—maybe much better than—that delivered from wall outlats. And during the time normel lina current is availabla, a battery cherger can keep the battery adequately chargad. Should the power fail, the battery itsalf will keep things going. No interruptions, flickers, or deta losses.

Logically there is no reason such a combination would not work es edvertised. Severel compenies hava, in fact, put togethar all-in-one boxes with exactly those elements to create a device called an unintarruptible power system (UPS), although it would more properly be called a "standby power supply." As tha name implies, however, a UPS supplies electricity without interruption. If the powar fails, tha computer end its volatile memory do not.

As a side benefit, a UPS besed on such a dasign is the ultimete power line conditioner. Its output is essentially a complataly isolated electricity generator, free from all the evil effects of switching transients, lightning, and line noise.

Beware, though, that not every so-called UPS isoletes its output from tha power line. Tha initiel configuration described ebove requires thet the battery charger not only charge the battery, but also supply enough power to operata the computar full-tima. Soma designers believe that much capacity is overkill, particulerly considaring thet tha cherger must run the whole computer only when alternete power, AC line current, is also available.

To aliminate this perceived redundan-

BEFORE you run out and negotiate a home fusion reactor, take note that energy independence is still expensive.

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cy, some systams are designad to route tha AC powar directly from the wail outlat to tha computer, and switch over to tha battery supply only in case of powar failure. With this configuration, tha battery

PC POWER requirements are determined by the particular functions you want to preserve in the event of a power failure.

chargar naad only be powarful anough to charge tha battery slowly and kaep it charged.

Tha bottom line is that a much smaller charger can be usad, and tha potantial price of tha complete unit is lower.

The lowar prica of tha standby-only units also buys a penalty; straight-through normal operation aliminatas the lina conditioning benefit of a trua UPS because raw, unconditionad powar lina electricity may be routed directly to tha unsuspecting computer. Better standby power systems also provide noisa filtering and surga suppressing circuitry, but such additional protection is not necessarily built in.

Apart from that basic design differenca, uninterruptible power systems and standby units vary greatly as to features and power capabilities. Both types of systems hava two limitations: the capacity of the built-in invertar, which datarminas the maximum powar that can ba suppliad at any givan instant from its battery, and the battary capacity itsalf, which daterminas how long backup powar will be available in event of a blackout.

Customized Protection

PC powar requirements are datarmined by tha particular functions you want to presarve in tha evant of a powar failure. You can prevent data loss by plugging only tha CPU, the IBM chassis itsalf, into the UPS, and by ralying on a UPS with minimum capacity, in the range of 100 watts. In this casa, the first thing to do when tha lina current fails is to save w ever is in memory. Howevar, if you tha IBM PC with a monitor that cann plugged in to a wall outlat separately the CPU, or if you want to coast throu power failure and keep slaving awa the computar, a larger UPS is neces because it must power tha monitor as as the CPU. In reality, most users rec the greatar capacity becausa the stan monochrome IBM monitor draws its ar through the mein chassis and it i practical to separata tham. Ramambe nominal rating of a standard IBM together with the IBM monitor is watts. A UPS with at least that capac naaded to keep it going.

Should you want to run your com er by alectric lamplight instead of ca light during an outage, even more ca ity is requirad; tha axact amount is d mined by what you plug in. How lon UPS naads to kaap your systam run depends more on you then your com er. If you're gung ho and nothing will vent you from squashing as much BA as you can into the helpless mach avan in tha dark, find a UPS that will ry you through tha longest imagin powar failure.

Usuelly, howaver, only a few min of backup is sufficiant—anough tim realiza what happaned, avaluata the etion and datarmine that it may be h bafore power is restored. Than you shut down your computar systematic saving data until you pay tha light b

Most computer users opt for a co nation strategy. Because most outage brief—under a minute—they prefe program right through tham. Only w it looks lika the local nuclear plant maltad down and it will be a while be anyone is allowad beck into tha stat thay pausa to shut things down.

This requires a battery condition i cator that shows how much longa UPS can carry the load. Unreconstru PC fanatics will watch tha indicator keep everything rolling until the situa becomas dasparate. Only than will shut tha system down.

Your requiremants for uninterrup powar may not be so extrema. In any the protaction you naed, whether to g against surgas in tha lina or assure a tinuous flow of anergy is probably a able. Like tha PC, the necessary eq ment is really an investment in time.

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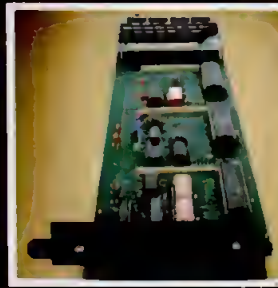

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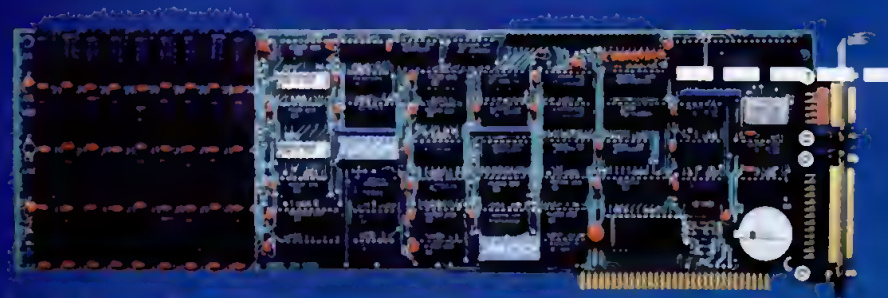
CIRCLE 452 ON READER SERVICE CARD

The Memory Board: Expandable, from 64KB for $275 to 256KB for $575.



The IDEAboard: Multifunction combination board. Memory up to 265KB. Options include serial interface, parallel interface (printer or SASI hard disk) and/or clock/calendar with battery backup. Prices range from $350 for 64KB with 1 option to $725 for 256KB with 3 options.

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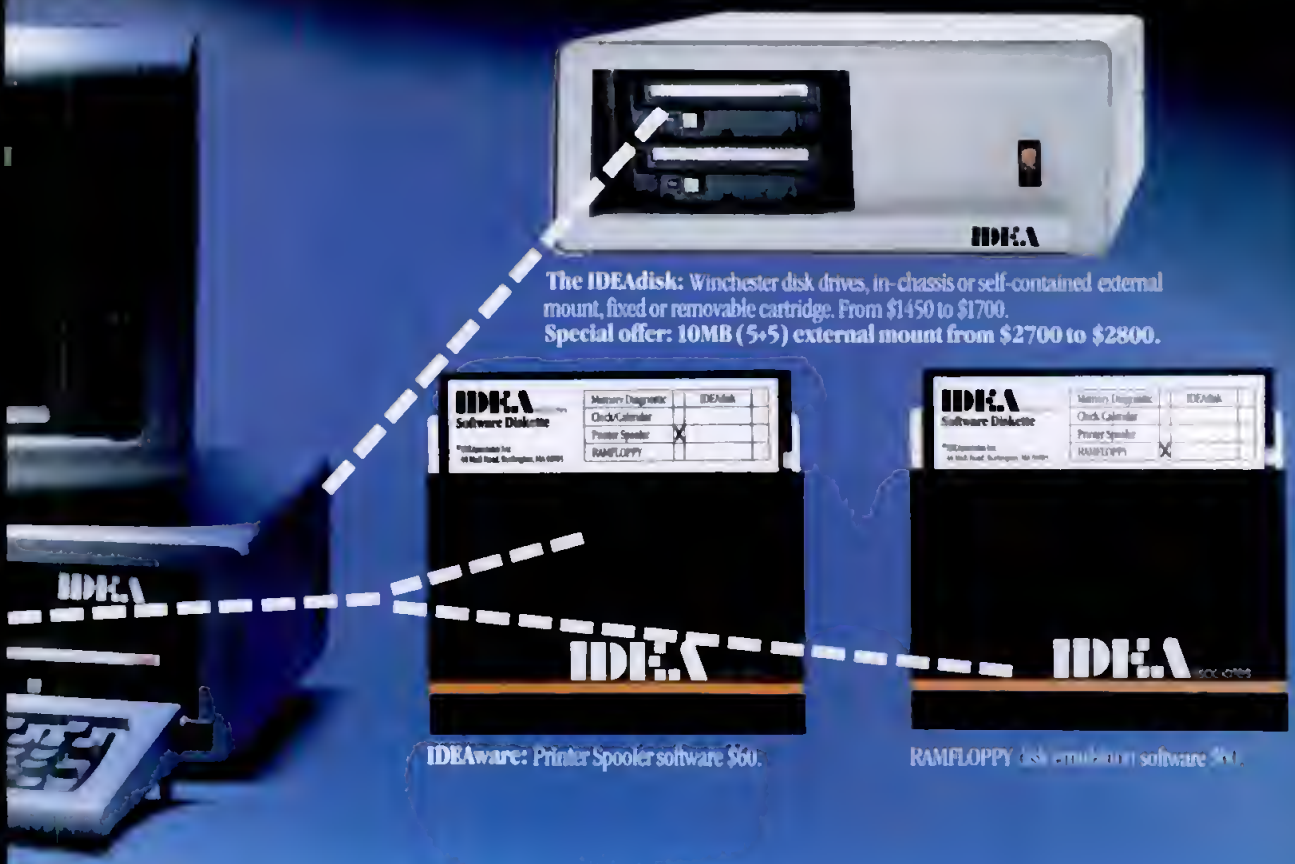

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CIRCLE 273 ON READER SERVICE CARD

)arks of static electricity may seem harmless, but ey can have a shocking effect on your PC.

Dut, Damned SPARK

Unlike most problems that bug and bedevil the IBM PC, static alactricity is not reluctant to make itsalf known directly to users as well. It's that ful, yet bothersome nip at your fin- ps evary time you touch a doorknob a quick shuffla across the carpet.

Though it usually is marely irritating, c electricity can be dangarous. Its ous dischargas can aasily dastroy dal- integratad circuits and have even set explosions that leveled entire facto- A mainframe computer system can rought to an abrupt halt by a single c flickar. A static jolt need not zap the putar directly to cause a problem. etimas a naarby static spark can cra- ufficient interference to cause a com- r to malfunction.

n large systems, where downtima s thousands of dollars per hour, static protection is a mandatory practica, evan though the methods may be elaborate and expensiva.

Personal computers, too, suffer when static is in the air. A small system user, such as a hobbyist, is likely to ignore thasa protection schemes. Anti-static sprays, carpats and mats, and anti-static chairs may seem at first to not be cost-affectiva additions to a home computer system. But once the cost of wasted time, frustration, and repairs is totaled up after a few static-caused problems, the prices of some anti-static alternatives seem more reasonabla.

Hard and Soft Errors

The connection between static electricity and computar problems is not hard to see, particularly when the monitor's screen blacks out just after the little blue sparks start to fly. But static can causa

Photograph: Dennis Bettencourt

subtle problems as well, like data that changas mystically when unwatched, program bugs that crawl away and hida when searched for, or perhaps a single command's failure to axecuta proparly. Usually static causes fleeting ona-shot errors, but somatimes the damage can be irrevarsibla.

All of the parsonal computer problams that can be caused by static are of two types: hard errors and soft errors.

A hard arror is a failure in computer hardware, tha electronic davicas that make up tha computar itself. Hard errors are permanent problems that won't go away. Oftan hard arrors are irrecoverabla becausa thare is no normal way for a usar to rastore tha system and gat it running again aftar tha arror occurs. Solving a hard arror will require a call to the repair shop.

Soft arrors are accidantal alterations of software in a computar program or data. Soft errors can occur during aither program execution or storage. Tha results may range from programs that refuse to run to a single incorrect digit in a massive spraadsheet—or perhaps a missing minus sign on the bottom lina.

If programs are backad up and the original data is still availabla, tha computar oparater usually can recover from an arror, gat the system up and running again, and make the necessary corrections to accidentally-altered data. Most soft errors are recovarabla—in theory, at least.

Computer systems differ in thair abilities to ward off thesa static-inducad problems. The IBM PC, according to spokesman Dan Scharer, is immuna to static shock, at laast in comparison to othar personal computars. Tha possibility of static causing a catastrophic hardware failure is remota.

Tha official word from the factory, in regard to soft errors, is that, given normal oparating conditions, static protection is not necassary. "But it wouldn't hurt," noted Scherer.

Although tha company says that soft arrors are unlikely to occur, soma usars have noted stranga consaquances from errant static dischargas upon the IBM PC itself—the monitor going blank is ona.

Tha manufacturers of static prevention and protection supplies note static ganeration is an unpredictable p nomanon. Unusual and unforeseen chargas of high intansity do occur, an electronic devica is totally safe from t affects. Tha anti-static suppliers wo have you beliava that, rather than rel on an equipmant manufacturer's as ances, tha bettar alternative is to el nate static problams before they occur. Given these alternatives, a may prefer to arr on tha side of pre tion.

Sources of Static

To evaluata the magnitude of p lems caused by static alactricity and effectiveness of possible solutions, first must undarstand what static is how it arisas.

Ordinary electricity—the house rent usad by applicancas and home c putars—is most simply defined as a of electrical charge carriars (electr through a conductor such as a wire.

Static alectricity is mada of the s stuff as housa current: that is, electr chargas. Howaver, thesa charges are moving, they are "static"—hance nama. (Incidentally, this term has not to do with tha "static" haard as r interferenca: the latter is also called mospheric noise.")

Although alectrical charges are car everywhare, thay usually don't c problams because they are trua to t nama, static. Thay creata problems when some force causas tham to mo

The push that gats static charges r ing between two points is a differenc

Triboelectric Series

When two materials that appear on this list are rubbed together, the substance higher on the list will pick up a positive electrical charge, while the lower will become negatively charged.

POSITIVE

Asbestos
Rabbit fur
Glass
Mica
Nylon
Wool
Cat fur
Silk
Paper
Cotton
Wood
Lucite
Sealing wax
Amber
Polystyrene
Polyathylene
Rubber balloon
Sulphur
Calluloid
Haid rubber
Vinylite
Saran Wrap

NEGATIVE

—From Dictionary of Electronics, edited by Rudolf F. Grof, Howard W. Sams & Co., Inc.

Product Information

These are a few suppliers of anti-static products.

ACL, Inc.
1960 E. Devon Ave.
Elk Grove Villaga, IL 60007
(Anti-static spray)

Inmac
2465 Augustine Drive
Santa Clara, CA 95051
(Anti-static rugs, mats, and spray)

Misco, Inc.
404 Timber Lane
Marlboro, NJ 07746
(Anti-static spray)

National Field Sales, Inc.
2660 West Chester Pike
Broomall, PA 19008
(Anti-static spray)

United Technical Products, Inc.
32 Southwast Industrial Park
Westwood, MA 02090
(Anti-static carpet, mats, chairs)

ctrical potentiel, called voltage. Much Neture abhors a vecuum, she's also not ppy about voltage differences. Sha'd ner that everything be et the same elec- el potentiel. Sometlmes, in that pur- t, lightnlng bolts ere burled. A static cherge going from your finger to doorknob is just another effort by ure to get back to e state of electricel

UNUSUAL and unforeseen discharges of high intensity do occur.

ality.

Friction ls one wey that differences in entiel arise to generete static electrici- Electrical charges can be physically bed off one materiel and on to another ause some meteriels ere more hospite- to negetive charges than positive, le others behave in opposite menner. ic electricity will only be genereted en dissimilar substances are rubbed ether; otherwise there would be no son for a charge to prefer one piece of erial over the other.

A set of different meterials can be ked in order of their tendency to act negative or positive charges when bed. Such e ranking ls celled e "tribo- tric series." The farther epart two arials are in a triboelectric series, tha ter the voltage potentiel is thet can be haved by rubbing them together. Thet ns if the triboelectric difference be- en two materiels in the vicinity of a PC reat, then there is likely to be e static blem.

Welking ecross a carpet frequently erates stetic electricity because the t common materials used for sboe s are widely separated on the tribo- tric scale from the most common car- fibers. Other factors also influenca the ic potential, including the aree, pres- , and speed of contact, and the coef- nt of friction between the materiels. Although friction contributes to the d-up of a static cherge, it is not the method of generating static. When

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two contacting surfaces are separated faster than the charges on them cen be redistributed, the surfaces may be left with net static charges. A static build-up such as this can occur when you rise quickiy from a chair.

Static voltages higher than 25,000 volts are not unusual. In fact, a discharge may need to be as much as 3,500 voits before some peopla will notice a static shock.

Just because discharges are not feit by people does not mean they will be safe for a computer. Static discharges as low as 2,000 volts may cause computer problems; discharges over 10,000 volts are almost certain to.

The reason that e high-voltage static shock feels more like a tingle than an e trocution is because there is little cur (or amperage) in static electricity. Th fore, there is little power even when voltage is high.

Computers are vulnerable to st electricity however, because damag their MOS (metal-oxide semiconduc integrated circuits (of which there many in the PC) is caused by voltage w out regard to current.

IF THE RELATIVE HUMIDITY is high, the greater amount of moisture in the air will result in fewer static problems.

Discharging Static Safely

Although the materials used to m up carpets and shoes does not cha static problems can vary from day to and season to season. It's not that stat generated on some days and not on ers. Rather, under some conditions static charges are drained off before potential can get very high.

Because little current is behind st these charges can be discharged thro what seem to be high resistances material that does not conduct eiectri well for most purposes can drain a st charge awey quite efficiently. Aitho 100 megohms (one hundred mil ohms) of resistance might be the vaiue substance used as an insulator in an e tronic circuit, it would allow the q draining of a static charga.

Humidity is usualiy the fector determines hows fest a static charg drained away. Moisture in the air o surfaces wiii conduct electricity slightly but can be enough to drain st charges away. If the relative humidit high, tha greater amount of moistur the air will result in fewer static p lems. In fact, when tha relative humi is ebove 50 percent, static probl almost cease to exist.

Unfortunately, no one can be gua teed that the relative humidity wil high. Mot environmentai control syst tend to lower humidity: both air co tioners and heaters lower it dramat ly.

Heeting air "dries" it out. As the temperature goes up, its ability to l moisture increases, but its moisture tent remains the same. Because heate can hold more moisture, it acts iik sponge and sucks moisture out of o things. That's why static is more of a p lem during winter months in tha n Most air conditioning systems, as v are designed to remove moisture from

ı make it feel more "comfortable." nmidity in an eir conditioned office ɔop below 20 percent. Whet matters . the outside humldity, but the lity of the aree in which tha com- is oparated.

ɔctrical conductivity also pleys a n determining whether static elec- will be e problem.

the materiel thet cerries e static e is not e good conductor of electric- e charges will not be eble to flow out ery wall. Discharging mey take sub- al time, in the form of a slow, low- e pulse lnstead of a lightning-like However, no stetic charge can build ı a good conductor beceuse the es will drain off as fast as they ere ated.

slzable static discharge only occurs ı a stetic cherge builds up ln en elec- ɔconductor thet is isolated from oth- nductors hy an insulator. Because nman body is a raletively good con- r and most shoa soles are very poor actors, people often cerry substen- ftatic charges around with them, to spark out.

ɔc Prevention

any of the conditions that generate ı charges or keep them from dreining e removed from your PC's envlron- . potential static problems will be d.

ɔcause static is genereted when dis- ar materials ere rubbed together,

THE ficial word from the actory is that static protection is not necessary.

: can be evoidad by wearing shoe made of a materiel thet is metched to arpet to minimize the triboelectric ence.

atic problems can also be prevented ɔt wearing shoes. When your body is nger insuleted from the floor, stetic ges are free to drain off bafore they become powerful enough to zap a personal computer. Going barefoot around your home or office computer, unfortunately, might be ruled out for reasons of personel safety or professional decorum.

Anti-Static Sprays

Tha most common solution is to apply an enti-static spray onto the carpet of the computer room. Sprays ere eesy to epply and ere reletively inexpensiva. Thay are evaileble either in individual aerosol or push-spreyer bottles. The fluid can be purchased seperately for about $10 a quert.

STATIC discharges as low as 2,000 volts may cause computer problems.

These spreys are designed to make the carpeting slightly conductive. As you welk on the sprayed carpet, some of the stetlc-lnhibiting meteriel collects on your shoes, meking them triboelectrically similar to tha carpet.

But sprays ere only e temporary solution. The coating rubs off, end with it goes the anti-stetic protection. Often the first sign that the sprey is no longer working is when you feel e tingling in your fingertips; by then it may be too late to save your computer from stetic damage.

Anti-Static Furnishings

A more parmanent stetic preventive is anti-static carpeting. Carpets made from some synthetic materiels mey seem to be—or mey even be edvertised as—low static. Polyester and ecrylic fibar carpats tend to create little stetic. The reeson is thet neolite, the most common and inexpensive material used for shoe soles todey, is triboelectrically close to the synthetlc fibers of the carpet. But the low-stetic quality of acrylic and polyester fibers cannot be depended on in every case. Someone wearing leather-soled shoes could stroll into the room and generete enough stetlc to giva himself—and the computer—a good jolt.

Computer-quality anti-stetic carpeting ls made from special meteriels thet heve electrical conductors woven through the pile. The carpet conducts wall enough to drain off the static es it is generated. Note that the resistance of tha conductive strands in the cerpet must be a carafully-controlled valua. If the carpet does not conduct well enough, lt will give little stetic protection. If the fibers conduct too well, the carpet would be dengarous; it could be the source of a severe shock if you accidentelly touch an electrical wire or outlet. Highly-conductlve carpeting, or any conductive flooring matariel, is es dangerous as e wet besement floor is for electrical work.

Computer-quality anti-stetic carpets can be quite expensive, especielly if you must remove e nearly-new existing carpet to install the protective one. A lass expansive elternetive ls to use an anti-static rug or mat.

Most enti-static rugs are woven from materiels similar to those used for computer-quelity carpets. They ere eveileble in e variety of colors, shepes and sizes, at prices thet ranga from about $50 for e 3 by 5 foot rug to severel hundred dollers for e lerger rug.

Anti-static mats resemble the carpets protectors placed behind desks to reduce the weer caused by chair casters. Either a controlled-conductivity compound may be used for the whole mat or e conductive meshwork mey be built into the mat's surface. A 2 by 3 foot mat mey cost $50 to $80; a 4 by 5 foot mat could cost more then $200. Dua to the properties of static electricity, a larger mat or rug offers batter protection then a small one.

Because arising from e chair can generate sufficient stetic to play havoc with a computer system, anti-stetic chairs elso ere evellable. Usually they are upholstered with a febric that hes conductive fibers woven in.

A humidifier can help alleviete stetlc problems by reising the relative humidity of the computer's environment above 50 percent. Using e humidifier ln the computer-operating aree has the side benefit of making the home or offica more comforteble for humen occupents during winter months.

If e humidifier is relied on for static protection, e hygrometer (which measures relative humidity) should be used to verify that conditions ere proper. /PC

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Think about the different vehicles available for buying software and add-ons for your PC. You can shop at local computer stores, but they usually have a very limited selection of products and a less-than-expert staff. You can buy through mail order—and take some big risks if you get products that don't work or don't do what you expected.

At PC '83 you have the best of all worlds. You can see *all* the different PC-compatible products in one location at one time. You can talk with factory experts rather than just local salespeople. You can 'test drive' each product and decide if it's right for you. And when you find what you're looking for, you can buy it right on the spot.

Best of all, you'll save hundreds—even thousands—of dollars at PC '83. Most of the products shown at PC '83 are sold at special show prices, so you won't have to look hard to find incredible values. And because PC '83 will help you make more informed purchase decisions, you'll end up with products that are better suited to your applications.

A REMARKABLE CONFERENCE PROGRAM

The conference program at PC '83 isn't just a warmed-over, watered-down version of other computer conferences. The seminars, workshops and forums at PC '83 are the result of months of research and planning targeted toward one specific goal: helping you get absolutely the most out of your IBM Personal Computer.

The program features world-renowned PC authorities speaking at over 100 educational sessions. Seminars provide an in-depth, understandable look at a broad range of PC uses for business, home and education. Seminars emphasize 'how to,' telling you specifically what you need to know—in non-technical language—to use the PC in dozens of different applications.

Forums present an inside look at what's happening in the IBM-compatible industry and what new developments you can expect in the next few years.

Software and Hardware Spotlights are a PC '83 exclusive. These workshops address one of the biggest problems that virtually all computer users face: how to decide which software and hardware packages are best for your applications. Each Spotlight provides a detailed discussion and demonstration (with large-screen television) of a group of products, covering their features, capabilities *and* limitations. Experts are on hand at each of these sessions to answer all your questions.

EASY ON YOUR FEET

We've thought of a lot of details to make your visit to PC '83 just a little more pleasant. As with all of our events, the show is fully carpeted, so your feet won't give out before you've seen all the exhibits.

Our unique Conference and Exhibits Guide helps you quickly find the exhibits and educational sessions you want to attend—even if you can't remember their names. And the Guide is provided free of charge to all attendees.

If you're traveling some distance to attend PC '83, we'll arrange a discounted hotel room near the show site through the PC '83 Housing Bureau. On request, we will also provide information on things to do, places to visit and where to eat in San Francisco and Boston—to make your stay in these grand cities a memorable and relaxing one.

A TOTAL SUPPORT SERVICE

Let's face it, getting support for your PC is tough. The PC magazines, newsletters, user groups and retailers are certainly helpful. But there are so many different products, services and things to learn about for your PC, what you really need is *one* event that brings everything together in one place in a well-organized format.

PC '83 does it all. It showcases all the PC-compatibles under one roof. It has a complete and comprehensive program of seminars, forums and product workshops. And it's produced with the quality and professionalism you've come to expect from Northeast Expositions.

So if you do anything with the IBM Personal Computer or if you're considering buying one, be sure to put PC '83 in your calendar right away.

Your PC will certainly appreciate it.

DAILY REGISTRATION FEES

Exhibits-only badges are $8 per day, and the Conference Program is $15 per day.

SPECIAL PRE-REGISTRATION DISCOUNT

If you plan to attend PC '83 save now with advance registration. Three-day Exhibits and Conference badges are $48, you save $21. Three-day Exhibits only badges are $18, you save $6. One-day Exhibits and Conference badges are $23 and one-day Exhibits only badges are $8.

ADDITIONAL INFORMATION

To receive additional information about attending or exhibiting at PC '83, including the Conference, Seminar, Workshop and Panel Discussions Program, or information on local hotels call 617-739-2000 or 800-841-7000 (Boston).

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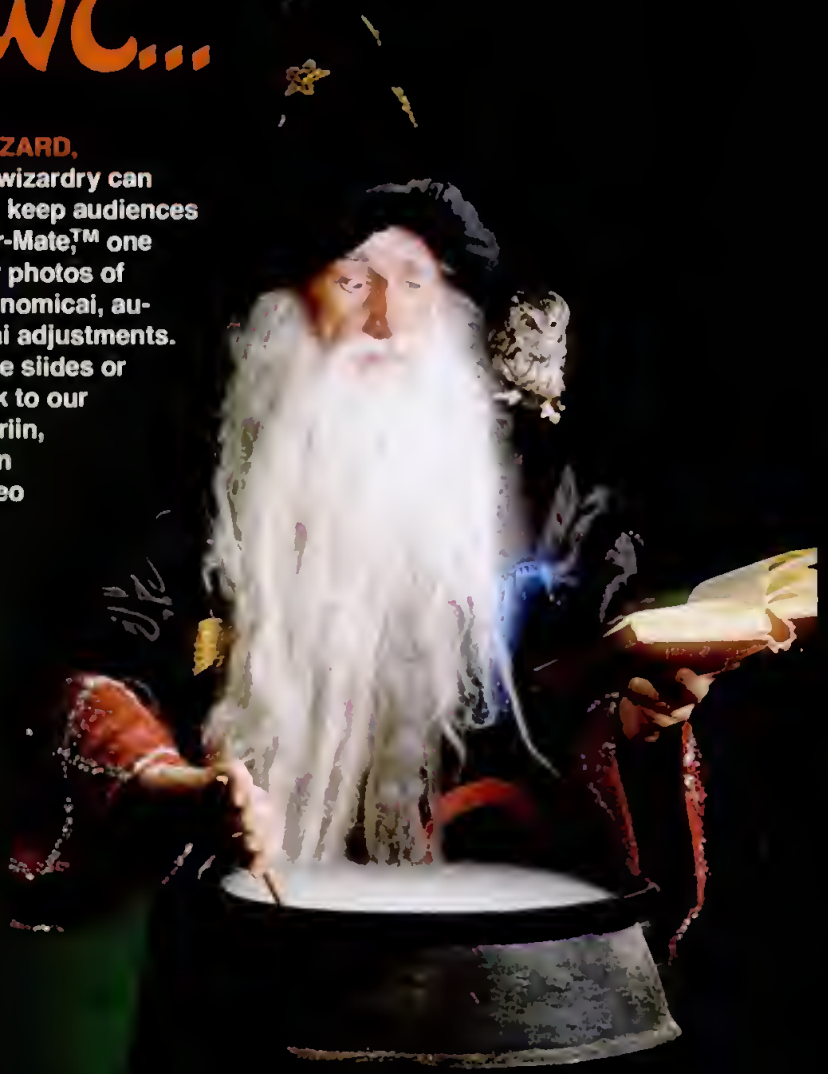

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lo, we're all okay, but ır computer's gone."

ld have been a lot worse.
kily, all that was missing was the
ıter and some spreadsheet software.
ıat should be covered by insurance.
it isn't. Ed didn't realize that once he
l using his home computer on business
ts, his homeowners insurance no
r would cover it.
ıddenly as the robbery had occurred,
ınd himself out several thousand dol-
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life seemed simpler then

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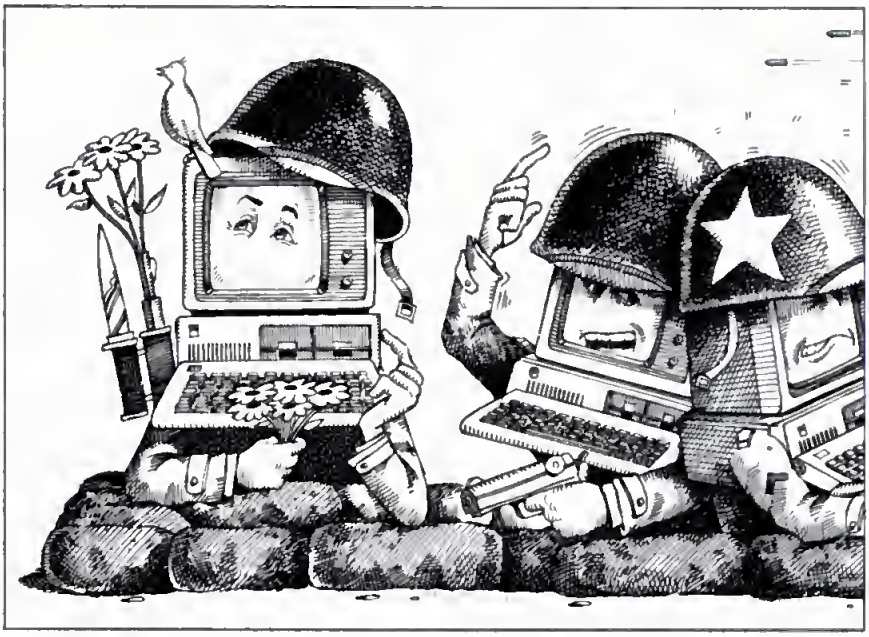
alectronic pride and joy is more just a tool; it's an expensive and por- asset.

ıopla hava always sought ways to ct thair valuables from thaft, fire and catastrophas. Whila digging a moat ıd your castle and keeping a billet of d guards might provida security, of us have to rely upon the tima- red institution of property insur-

var the past 50 years, the insurance ıass has blossomed into a huga, ıwida industry. It is now possibla to a virtually anything for a price. cians can buy covarage for thair lips, s, and voices, and athlates pay stiff lums to insure their various limbs. o, tha Parsonal Computer needs cov- as it movas into small businesses ıomes.



THE LOSS OF ıluable software and ıta disks gives rise to me unique problems.

ther Piece of Furniture

ıy computer used in tbe bome, for ehold or hobby work, is a "home utar." Generally, home computers cludad under the property coverage portion of your homaowner's or rentar's policy. Tha policy probably does not automatically include specific coverage for your computer, but the computar will be traatad tha sama as any other bousehold proparty, such as talevision sets or furniture. If it is stolan or damagad in a way that is covared by tha policy, the insuranca company will cover the loss. Tha amount paid by tha company dapends on the type of policy. Soma policias provide for paymant basad on a dapreciated value of tha systam, whila others allow for replacement with like goods.

Tbough the homeownar's policy may adaquately protect tha hardwara of a homa computer, tha loss of valuabla software and data disks gives rise to some unique problams. These problems ganarally fall into two categories. The first of these is tha problem of valuation. To reimburse an insured person for a loss, insuranca companias must be able to put a valua on tha property in question. In tha casa of commercially available software, this is fairly easy. However, information that is stored on a floppy disk or a hard disk, such as a programmer's coda or a writar's text, is not easily assessed. Unfortunataly, in such instancas, the insured will be abla to recoup only tha value of

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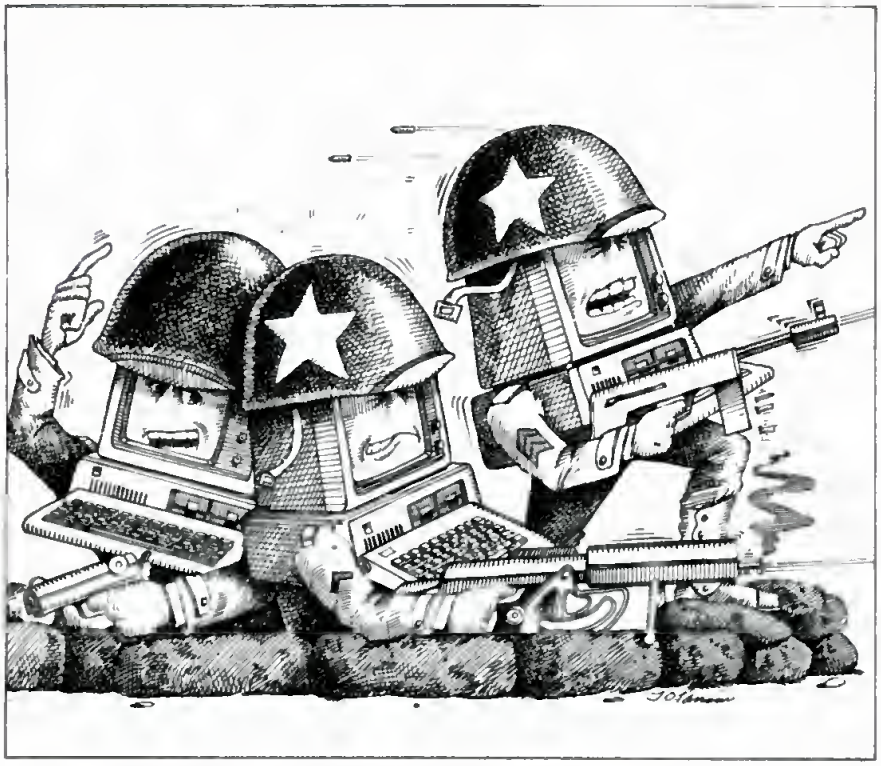

tha blank disk. This is little consolation to the novelist who hesn't been keeping hard copies and loses two full disks in a fire.

The second category of problems involvas tha means by which electronic data may ba "destroyed." In addition to the usual destructiva forcas that thraaten the property owner, the computer user has to be wary of such evils as magnets, direct sunlight, static elactricity, and spilled beverages. Although the issue hes not been widaly tested, it appaars that insurance companies will deny reimbursement if data is lost through these means. How, than, can you best protect your investment in both time end monay?

TELL YOUR insurance agent you would like special coverage for your PC and software.

Going With a Float

Many homeowners' policies cen be modified to include whet is known in the industry as e "floater." Floaters are extensions of covarage incorporeted into en insurence contrect for specific items. For exemple, meny paople includa floaters for certain pieces of jewalry. A velue is declered, and an appropriate increese in the annual premium is essessed.

A few insurance companias currently heve floeters espacially dasigned for computers end software. Howaver, the ganaral floater form will suffice. Tell your insuranca egent you would like special coverege for your PC and software. You can than set a value on your system and increase your coverage accordingly. Although the premiums will vary from company to company, tha rata should ba about $.70 per $100 of value.

Following thasa staps will result in proper insurance covarage for your home computar systam. If you use your domestic PC for business purposes, different steps will have to be teken to insure it.

A Degree of Business

Often it is a matter of degree whether a computer is being used for business or home purposes. If you use your PC for some business purposas, chances ar
elso use it for domastic chores. Afte
isn't this what tha micro revolution
ebout?

If e loss occurs, and some busines
is involved, some insurance comp
will decida whethar the primary u
home or business. Others will try to
rata tha amount paid in the evant of a

*THE ONLY WA
to fully protect agai
loss is to take
preventative measur*

In eny event, business use can causa
lems when you attampt to collect un
homeowner's policy.

Insuring Your Business

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normel homeowner's or renter's i
ance. This is true regardless of where
computar is located. Until recently,
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cy. This policy typically insures the
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PL, an extremely fast and powerful language, s been used on mainframes for decades. Several rsions are beginning to appear for the PC.

APL

Programming With Funny Symbols

ur idea of a PC is simply e smell beige e of office furniture that you stick r spreedsheet or word processor disks , you mey find this article e bit dull. if you do any kind of mathematical or tional computation, or think that hav- access to a PC without trying your d et programming is like buying e ereti with an automatic transmission using it to heul grevel, whet follows astonish you.

Whether you're e beginning progrem- who has barely cracked the IBM IC menual, or e dieherd code writer se favorite sport is error trapping, ve probably discovered whet e mixed sing BASIC can be. While it is e fairly ble end versatile language, it chugs g on its wey to the very bottom of y benchmerk test. Its meny restrictions and weaknesses heve sent hordes of programmers scurrying to find other lenguages thet ere fester and more powerful.

Dream for a minute ebout the convenience of having a high level programming lenguage in which data types do not require declaration in edvence, maximum velues for array subscripts need not be specified, arrays can be operated on directly without using nested loops, user-defined functions follow the same syntax rules es do the lenguege's primitive functions, the hierarchy of function execution is simple, numeric and character data need not be distinguished by speciel symbols, and many complex mathematical and reletional processes are availeble as single-keystroke functions. If these tickle your fency then the computer languege APL may be just whet you need. Although not too well known, APL has just become available for the PC and is repidly gaining favor.

MAXIMUM values for array subscripts need not be specified.

APLers can be found throughout the world in universities, businesses, government egencies, and public schools. Their numbers, elthough small, include econo-

mists, sciantists, engineers, statisticians and information analysts of all types. Many APLers who cut their computing teeth on another language never looked back once they discovered APL, and triad to forgat their first language as quickly and complataly as possible.

ARRAYS CAN BE operated on directly without using nested loops.

My own experience is a case in point. As a graduate student in economics during tha 1960s, I programmed economic models and econometric routines in FORTRAN. Several yaars later I began using DYNAMO and CSMP. My first exposure to APL was at the University of Alberta in 1969, but it took two more years before I finally conquered my resistance to change and started making the switch to APL. Today I look for every excuse possible to avoid using FORTRAN, BASIC, or whatever.

APL is full of built-in features not found in any other ganeral purposa language. It can usually accomplish with a few symbols on one line what would require a dozen or so lines of code in anothar language. Tha situation is not unlike the conversion from tha English to metric system of measurement. Thomas Jefferson won the battle to put the United States on a decimal monetary system, but was not successful in convincing his compatriots to adopt the metric system. We are still stuck with the English system today. Many programming tasks could be greatly simplified if written in APL; but FORTRAN, BASIC and related languages still prevail. Resistance to change is always great.

Language Origins

APL is a machine executabla notation for analyzing information. Tha acro APL is derived from the book *A Progr ming Languoge* (1962) by Kanneth E. I son. This language had its origins in 1950s as a notation that Iverson de oped at Harvard Univarsity for descri solutions to linear diffarential equat used in an economic input-output m being constructed by Professor Wa Leontief. In 1960, Iverson joined Tha languaga was usad to describe

USER-DEFINED functions follow the same syntax rules as do the language's primitive functions.

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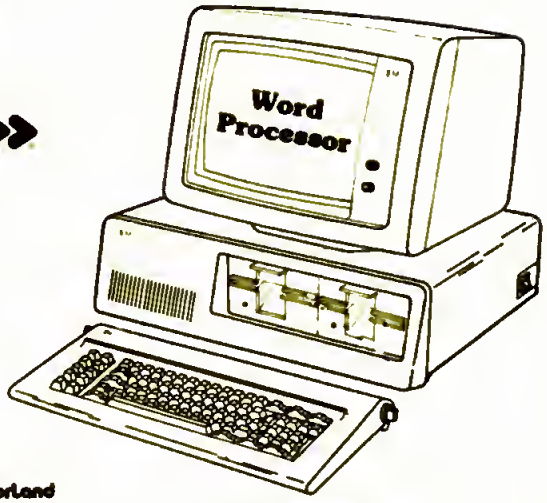

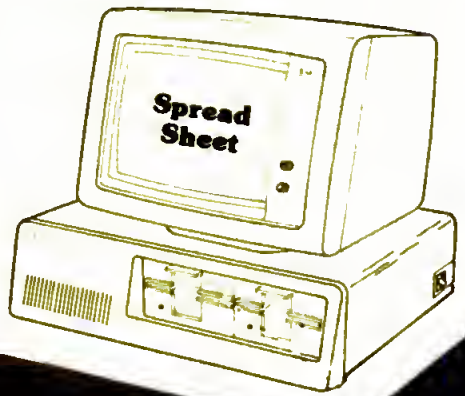

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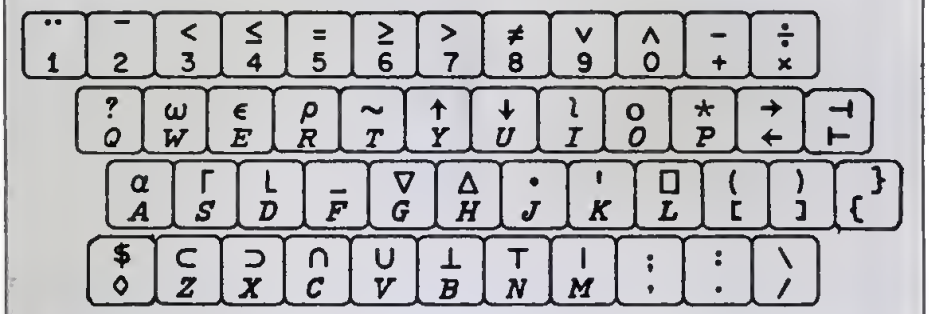
Figure 1: The APL keyboard.



mechines that leter became the iBM series of computers.

Most important APL developm occurred in the mid 1960s, during th called "Period of Implementetion. quick succession, a character set formed, the language was linearize type bell was developed for the IBM terminal, end by 1965 an interpret implementetion was up and working experimental version was availebl the IBM System/360 by the fall of 1 and it proved to be a practical and cient computer lenguage. By 1968, wes available outside IBM.

Since its public introduction, APL ettracted the ettention of the busi community through the efforts of time-sharing firms, I. P. Sharp Assoc Ltd. of Toronto, Canede, and e Mary company, STSC, Inc. A second grou APL enthusiasts can be found et univ ties throughout the world.

APL Fundamentals

The fundementels of APL are de tively simple yet surprisingly powe The most noticeable difference betv APL and most other languages is its ecter set (see Figure 1). The alphabet sists of an uppercase italic font ent

THE HIERARCH of function execution is simple.

from an unshifted keyboard. Num appear in their usual positions in th row. But the positions normally occu by the capital letters are taken up new set of characters, most of whic probably unfemiliar. Symbols such − , × , ÷ have their standard mean but symbols such es ⍴, ↓ , ⍞, ⌊, Δ d heve any immediately obvious interp tion. Moreover, APL has an expande of symbols that are formed by overs charecters, such as ⍒, ⍋, ⌹, ⍎. i these speciel characters provide a s "primitive" functions that handle a variety of arithmetic, Boolean, rati selection and structurel operations.

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At its simplest, APL is a fancy calculator. APL normally positions the cursor seven spaces to the right of the margin while waiting for information to be entered from the keyboard. This is illustrated in the examples below.

NUMERIC AND character data need not be distinguished by special symbols.

Let's try a few APL expressions. For example:

```
      6+8
14
      3×10
30
      2÷3
Ø.6666667
```

Familiar arithmetic operators have their usual meaning, as demonstrated above. But what about some of the other symbols? Guess what each of the following ⍳, ⍬, ⌊, APL primitive functions does:

```
      ⍳5
1 2 3 4 5
      ⍳3
1 2 3
      ⍬10 15 20
20 15 10
      ⌊5.2
5
      15⌊16
15
      15⌊14 15 16
14 15 15
```

The symbol ⍳ acts as an index generator, producing the integers from 1 to the integer appearing to its right. The overstruck symbol ⍬, composed of a circle ○ and stile ⌶, reverses the vector of numbers appearing to its right. The last three examples use the downstile symbol ⌊. When right argument only ("monadic" form),

MANY complex mathematical and relational processes are available as single keystroke functions.

this symbol becomes a floor operator that yields the integer part of its argument. When ⌊ is used with a left and right argument ("dyadic" form), the result is the minimum of the two arguments. The last example shows that dyadic functions in APL may have arguments of different dimensions.

The major objects of APL are arrays. These may be scalars, vectors, tables

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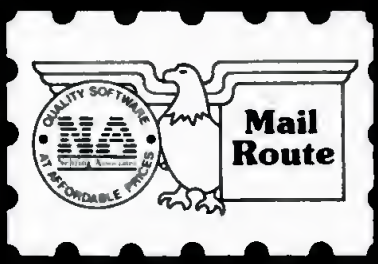

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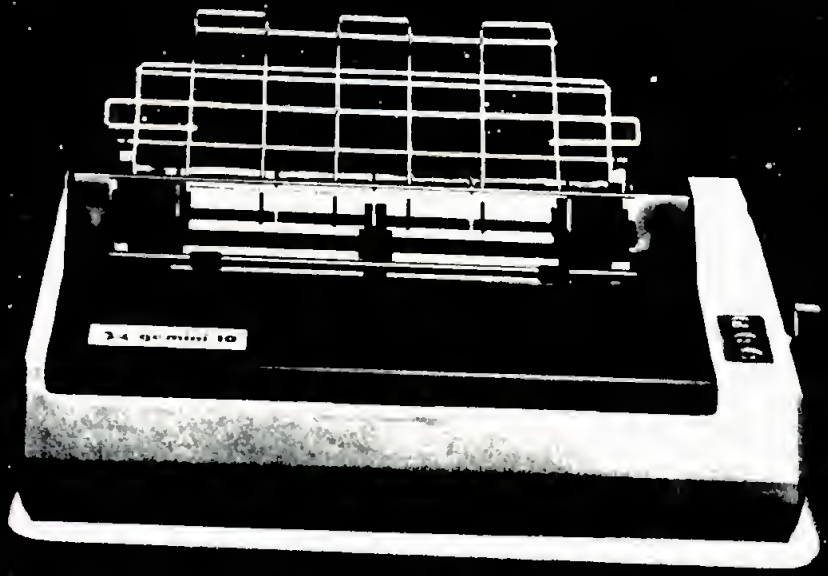

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matrices of two or more dimensions. Arreys mey be composed of either numeric or alphsbetic information; there are

APL IS deceptively simple yet surprisingly powerful.

only two dets types. Arrays are manipulated using APL's primitive functions.

There are three types of statements. A nome assignment is eccomplished by:

```
A←1 10 100     (e number vector)
B←'ABC'        (a charecter vector)
```

A branch statement is given by:

```
→10
```

A displsy stetement is eny statement without a brench or ssignment format such ss:

```
      A
1 10 100
      B
ABC
```

User-defined functions are also easily constructed. These functions have zero, one, or two erguments, snd the syntax for thelr use ls identical to thet of primltive functions. A sceler function extends arrsys to higher orders element-by-element. There is only one rule for order of execution, sometimes referred to as the "right-to-left" rule, and it applies to both primitive and defined functions. The rule is thet "the right-hend argument of eny function is the velue of the entire expression to the right." Subject to this rule, perentheses control the order of execution in the usuel wey. There ls no need to specify e hierarchy for function execution. The execution rule is shown by:

```
      3+5×4
23
      (3+5)×4
32
```

Most primitive scelar functions have

Figure 2: Specificotion and disp variables for APL one-liners.

```
      A←'ABCDEFGHIJKLMNOP
STUVWXYZ'
      A
ABCDEFGHIJKLMNOPQRSTUVWX

      X←1,3 1⍴1.16 1.96 3.0
      X
1 1.16
1 1.96
1 3.09

      Y←3 1 2
      Y
3 1 2

      M←4 3⍴'BOBANNSUEDON'
      M
BOB
ANN
SUE
DON
```

monedic and dyadic forms. If the (sign ÷ is used monadically, it calcul reciprocel; used dyadically it per

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Figure 3: APL one-liners.

```
AVERAGE OF VECTOR Y
      (+/Y)÷⍴,Y
2

VECTOR Y IN ASCENDING ORDER
      Y[⍋Y]
1 2 3

MEDIAN OF VECTOR Y
      .5×+/Y[(⍋Y)[⌈ .5 .5×1+⍴Y]]
2

PRIME NUMBERS UP TO INTEGER N
      N←20
      (~I∈I∘.×I)/I←1↓⍳N
2 3 5 7 11 13 17 19

ROUND MATRIX X TO P PLACES
     P←1
     (10*-P)×⌊.5+X×10*P
1 1.2
1 2
1 3.1

LINEAR REGRESSIONS OF Y ON X
     Y⌹X
2.88057004 ¯0.4253961B

BINARY REPRESENTATION OF INTEGER N
     N←13
     10⊥2 2 2 2⊤N
1101

HISTOGRAM OF FREQUENCIES Y
     (' *')[1+(⍳⌈/Y)∘.≤Y]
*
* *
***

N-TH ORDER IDENTITY MATRIX
     N←3
     (⍳N)∘.=⍳N
1 0 0
0 1 0
0 0 1

ALPHABETIC SORTING A LIST OF NAMES M
     ⍙(⍙M)[⍋(1+⌈/MI)⊥MI←A⍳⍙M]
ANN
BOB
DON
SUE
```

the normal division operation. Tbese illustrated by:

```
      4÷2
2
      ÷2
Ø.5
      4×÷2
2
```

APL has a unique character set, ma primitive functions, simple syntax rul few expressions types and an uncom cated execution rule. But APL is capa of much more than the simple calculat type expressions presented above.

APL One-Liners

One of the reasons that APL is not u versally popular is that APLers relish challenge of compressing as much as p sible into as few symbols as possible. T practice, while intellectually satisfyi produces short, often incomprehensi programs. The so-called "one-line have for many taken on the character idioms. Figure 2 specifies some typi APL variables that will be used for

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CIRCLE 502 ON READER SERVICE CARD

ine examples of Figure 3. These fications indicate the typical wey in h variables are constructed in APL. v eech one-liner in Figure 3 is the t using the data from Figure 2. use APL can operate directly on s, the use of loops can generally be ed. It is fair to sey thet only a frac- of the time that would be spent ing BASIC in order to progrem these iners need be spent learning APL in to eccomplish the seme tesk.

r-Defined Functions

PL hes edequete fecilities for input utput control that can be demon- d with severel user-defined func- Consider the problem of converting tor of temperatures from Celsius to nheit and vice versa. Let's begin the Fehrenheit temperatures:

```
F←¯40 32 98.6 212
F
32 98.6 212
```

n APL function to celculete the cor- nding Celsius temperatures is de- fined by

```
      ∇ Z ← CEL F
[1]   ⍝ CONVERT  FAHRENHEIT  TO
        CELSIUS
[2]   Z←(F−32)×5÷9
      ∇
```

The function name in the example above is CEL. It is monadic with argument F which represents the Fahrenheit temperatures to be converted, end it returns an explicit result denoted by Z. All that

So-called "one-liners" have taken on the character of idioms.

APL requires once a function is defined is to enter its neme and values for its arguments if eny. For example enter:

```
      CEL 212
100
      CEL 32
0
```

Recalling thet the varieble F was specified above, try:

```
      CEL F
¯40 0 37 100
```

If these Celsius temperatures are to be saved in a variable of C then enter:

```
      C←CEL F
      C
¯40 0 37 100
```

Displeying C demonstretes thet the function CEL can assign values to a varieble. Next, a function FAH comparable to CEL for converting Celsius to Fahrenheit can be defined es:

```
      ∇ Z ← FAH C
[1]   ⍝CONVERT CELSIUS TO
        FAHRENHEIT
[2]   Z←32+C×9÷5
      ∇
```

Finally, suppose that a function must be written that will display a table of equivalent Fahrenheit and Celsius tem-

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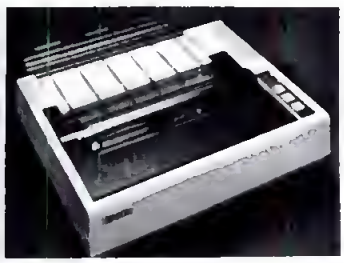

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Waterloo microAPL is ona component of an extensive software peckage developed for the PC by Waterloo Computing Systems Limited. It follows the IBM/ACM standard for languege features. The shared varieble processor is not included, but a file system containing sequentlal and random access files is provided with APL system functions needad for communication. IBM PC color and graphics features are also supported.

The minimum system configuration to run APL is 192K RAM, ona disk drive, and either the monochrome or color monitor. Wetsoft's APL package sells for $295 and consists of:

- microAPL and microEDITOR disks that run under DOS
- An APL Tutorial/Reference Manuel and System Overview Manual
- A 24-pin APL character-generator chip that will work either on a monochrome or color monitor
- APL keyboard stickers
- One optional APL printer EPROM (costing an additional $75)

You must have e hefty emount of memory, a slot evailebla for the edepter board, one chip installed on the PC circuit board and another optionel one in tha printer. You can perform the instelletion yourself, but mey went to seek assistance. The instructions from Watsoft are clear and aesy to understend, and everything functioned as edvertised.

What does ell this do to your PC? The APL character-generator chip on the displey adaptar has the sama charecters es IBM's chip ln positions 0-127. However, charecters for codes 128-175 and 224-253 heve been repleced by APL eymbols.

The optlonal printer chip allows printing of upper and lower case ASCII symbols and all the APL charecters axcept the underscored elphabet. You do lose tha grephics symbols with codes higher than 128 unless you reset the 'SW1' switch inside the printer. This is not very convenient, however, since the printer must be dismentied to make the required change.

Thorough Documentation

Tha documentetion for APL is very comprehensive. There is e complete tutoriel section thet introduces the important features of the language. The reference manual provides enswers to most questions. Howaver, tha quelity of printing in part of the manuel is vary poor. In sevaral places, APL symbols, especially overstruck characters, are difficult or impossible to recognize.

More informatlon could be supplied on files. If you are eccustomed to using e file system with APL, there is no problem. But meny meinframe APLers or new converts may heve trouble. Finally, a set of utillty functions should be provided to make lt eesler for the new APL user to get started. There is e brief eppendlx on "Mechine Language Routines," but it is not for beginners.

I found several details of the We microAPL implementation disturbi

- A limitation on workspace si 56K, regardless of memory size
- No underscored characters o printer
- System commands such as and)VARS that do not alphabetize object lists
- No provision for groups)GROUP,)GRPS,)GRP
- Copying a large number of o from a workspace is very slow and consuming
- Upon leeving APL and raturni DOS, the BASICA command us causes a system crash

One final caution: tha APL p chip available from Watsoft works IBM MX-80 printer, modal 5152. newer printers now being supplie IBM (et least ln Californla) wlll not with this printer chip. Watsoft can vide information ebout alter sources of printar chips but this n you must deal with e third-party sup Unless you like experimenting with ware, you should locate a model 5

Verslon 1.2, which has just released, provides substantially fast to the displey and the disk. And earlier versions required tha purcha specielly-configured serial board does not.

In summary, Weterloo microAP first rata implemantation of APL. used on a stand alone basis, it shou viewed as an educational and dev ment tool. It is not really meant to commerciel appllcation of APL. Fac are availabla howavar for communl with a host system.

atures given a vector F or C tempera-
es but not both. Such a function is:

```
  ∇ Z ← TT TEMPTABLE T
] ⍝TT=1 FOR CELSIUS T
] ⍝TT=2 FOR FAHRENHEIT T
] →(L1,L2)[TT]
] L1:Z←7 1 ⍕T,[1.1]FAH T
] →L3
] L2:Z←7 1 ⍕(CEL T), [1.1]T
] L3:Z←('  CEL  FAH',
  [0.5]'¯'),[1]Z
  ∇
```

This function is dyadic since it con-
s two arguments. TT stands for tem-
ature type and causes a branch in the
ction to the appropriate calculation
. TT=1 indicates that argument T
tains Celsius temperatures while
=2 indicates that T contains Fahren-
t temperatures. The details of TEMPT-
LE are not important but note that
ctions such as CEL and FAH may be
led from within a function. Recalling

BECAUSE APL
n operate directly on
rrays, the use of loops
can generally be
avoided.

previously defined vectors C and F
use of TEMPTABLE is illustrated by:

```
  1 TEMPTABLE C
 CEL  FAH
 ---------
.0  ¯40.0
.0   32.0
.0   98.6
.0  212.0

  2 TEMPTABLE F
 CEL  FAH
 ---------
.0  ¯40.0
.0   32.0
.0   98.6
.0  212.0
```

yourself how you would program the
tions CEL, FAH, and TEMPTABLE in
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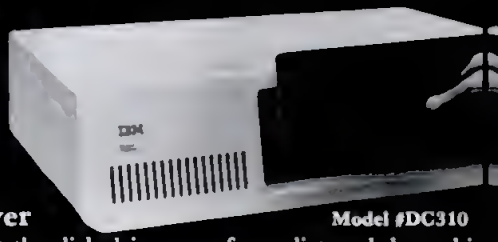

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I had used APL aimost daiiy since the late sixties while working et IBM. When I recently bought en IBM PC to use at home, I was delighted with many of its feetures. The crisp monochrome monitor, for example, was a vast improvement over the clettering 2741 terminal thet hed dominated my Armonk office. But I was very disappointed that the PC did not support

1: *Informal comparisan af APL*PLUS/PC and BASIC in counting and ating cumulative sums.*

N	LOOPCOUNT	RHO COUNT	SUMTO
1,000	18.5	0.1	0.8
3,000	55.6	0.2	2.3
5,000	92.7	0.3	3.7

APL.

Over the years I had accumulated a thick stack of APL programs and utilities that I used in my work as a communications research psychologist. These had been my everyday tools, but would not run on my PC. I was hungry to once again sink my teeth into APL.

So when PC asked me to take a look at an APL package produced by STSC, I immediately canceled a long-awaited cross-country skiing trip and closeted myself with the manuals. Skiing could wait; APL was my first programming language and an exceedingly powerful one, and I was eager to see how well it was implemented.

THE BOOKS are designed for beginners and are exceptionally well put together.

STSC, the company that produced the APL*PLUS/PC package, is the leading supplier of APL services nationwide. It was founded in 1969 as a computer time-sharing organization specializing in corporate financial management systems and other APL development services.

Headquartered in Rockville, Maryland, STSC has offices in 21 cities in the United States and Europe, and provides educational and consulting services as well as user support. The company had previously released a stand-alone APL package for the TRS-80, but its implementation for the IBM PC is far more advanced. As a result, the APL*PLUS/PC system offers much faster program execution time and runs much larger programs than previous versions.

The package includes a disk, several books and manuals, and a substitute ROM chip containing the more than 50 special APL symbols at the heart of the language. On one side of the disk are the required APL systems files; turn it over and you find several demos and utilities. STSC provides the user with two excellent books on the APL language, and a fat 3-

Figure 2: Comparison of APL*PLUS/PC and BASIC in computing the mean, standar deviation, maximum and minimum of a series of numbers in floating point.

	Number of Seconds to Execute		
Number of Numbers	BASIC	APL	Difference Factor
100	5.3	0.7	8
500	17.5	2.9	6
1,000	32.9	5.7	6
5,000	156.6	29.1	5

Figure 3: Comparison of APL*PLUS/PC and BASIC in sorting a series of numbers.

	Number of Seconds to Execute		
Number of Numbers	BASIC	APL	Difference Factor
100	20	0.3	67
200	44	0.6	73
500	120	1.2	100

Figure 4: APL Programs Used In The informal time tests above.

```
     ∇ LOOPCOUNT N
[1]  ⍝ COUNTS TO N USING LOOP
[2]    C←∅
[3]    START:→(N=C←C+1)/END
[4]    →START
[5]    END:'DONE'
[6]  ∇

     ∇ RHOCOUNT N
[1]  ρNρ1 ⍝ CREATES VECTOR OF N 1S THEN GIVES VECTOR SIZE
[2]  ∇

     ∇ SUMTO N
[1]    SUM OF NUMBERS FROM 1 TO N
[2]    +/⍳N
[3]  ∇
```

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ring binder explaining its particular implementation. The books are designed for beginners and are exceptionally well put together. The manual is eimed et experienced APLers, and is not up to the standards of the rest of the package.

Under The Hood

This weakness becomes epparent as soon as you begin to install the new ROM. Installetion instructions are buried at the beck of an eppendix. The manual tells you to look for the character chip you are to replace by examining the tiny numbers stemped on otherwise identical chips under the hood. In my PC, many of the ROM chips had blurred or missing ID numbers, and I had to start pulling out boards to examine them ell. There were no diegrams, and the directions were ly confusing. After half an hour of zling over which chip to remove, I ca the Rockville office, where I rece prompt, gracious help. It turned out the chip I was looking for was on monochrome adaptor board and not mother board itself. They admitted others hed compleined ebout instructions.

However, once I found the locati the ROM, installation was a snap. haps I should have known better, but not make it easy for people and be about such things in the first place?

STSC IS the leading supplier of APL services nationwide.

DEVOTEES OF APL claim that user can develop APL programs four to te times faster in APL than in FORTRAN BASIC.

I was concerned that the subst character set in ROM would turn m into an APL-only machine. Would eble to use *EosyWriter* to write this cle? Would this prevent my two Devid end Daniel, from pleying *Deo* lon? Would I still be able to use BAS booted up APL with bated breath.

Everything worked perfectly. The clal APL characters replace only the obscure end least needed characte the IBM set. You lose the four pl card suits and other low-demand ch ters such as the lower case y wi umlaut ebove it. You still have 256 acters, including upper- and lowe alphebets; virtuelly all of the French, man, and Spanish specisl characters all the punctuetion you could want. 96 ASCII characters and the 46 line d ing symbols are not altered.

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g you could before you started using

PL*PLUS/PC runs under DOS, and systems fully reside in memory. As akes up 90K, however, the minimum m requirement is 128K. The system load any DOS files from within APL, h lets you pull in VisiCalc tables, for mple, then manipulate the data in and send the revised tables back to disk or to a remote location in Visi- form. And it allows the PC to func- either as a dumb or a very smart ter- l. It even enables you to download onto your screen from a remote ce vie modem and then pull this rmation off the screen into memory.

nking Mathematically

athar than just a computing lan- e, APL, which stands for A Program-

*THE PL*PLUS/PC system offers much faster ogram execution time nd runs much larger ograms than previous versions.*

Language, is an algorithmically-ori- mathematical notation system that the user and computer can under- . When you learn BASIC or Pascal learn a computer language. When earn APL you learn a language that and the computer share. And, not lly, you learn a language that helps hink mathematically.

ogramming in APL makes use of a number of special symbols. Some of such as + or − or × or ÷ are used nventional way. However, most of PL operators provide powerful func- not normally available. For in- e, the symbols ⍋ and ⍒ are used to ⌈ and ⌊ to find the maximum and mum, +/ and +\ to do sums and lative sums, and ⌹ for matrix divi- o solve simultaneous equations giv- et of variables on one side and coef-

ONCE I found the location of the ROM, installation was a snap.

ficients on the other. Other symbols allow indexing, searching, and various relational operations.

These various "primitive" functions are extremely powerful tools that allow you to write programs using extremely concise code. Devotees of APL claim that users can develop APL programs four to ten times faster in APL than in FORTRAN or BASIC.

When I first began working with computers in 1953 for a series of research studies at NYU on teenage drug use, I wanted to include advanced multivariate analyses using six 75 × 75 matrices, and commissioned IBM to write a program that would do it. It took IBM a *full year* and cost $1,500 (remember, this was 30 years ego). The same program in APL can

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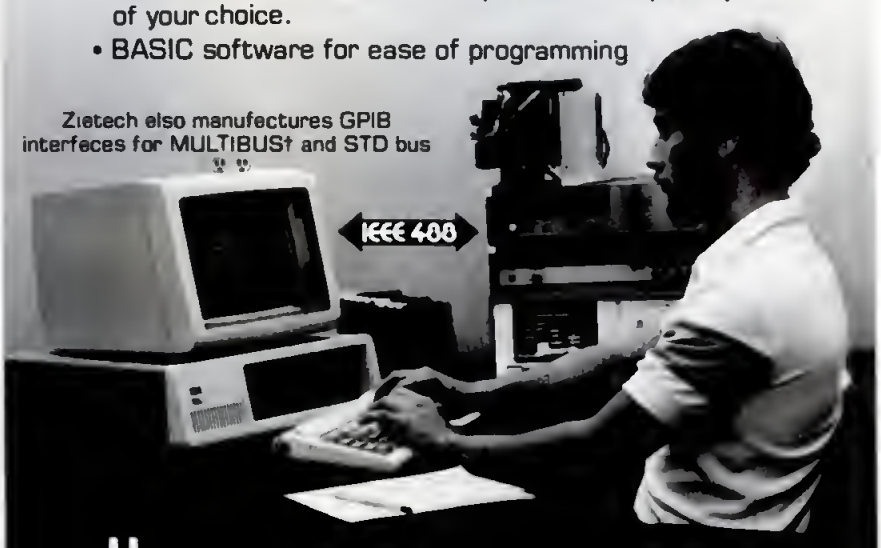

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be written in one *line*:

```
     ∇R←X CORR Y
[1]    R←AVG(STD X)×STD Y
     ∇
```

This program is set up as e user-defined function thet takes both e laft and e right argument, and yields en explicit result thet can be displeyed, stored, or incorporated into other functions. It uses the functlons AVG and STD, which must be in your active workspace. APL is ideally suited for such modular programming.

Short And Sweet

Becausa APL allows you to be concise, APL programs are generally very short.

WHEN YOU learn APL you learn a language that you and the computer share.

There was e story going around the Yorktown Heights Research Center years ego that the original programming for a BASIC was written in one day APL.

APL*PLUS/PC gives you an a workspace of ebout 41K with a 128K tem. If you have a 512K system, the v spece increases to 420K. Stored v speces, each with its own user-sup nama, are available from library dis

While STSC recommends usin 8087 co-procassor, my impression i this would be necessary for unus large number-crunching jobs only. without the co-processor, APL is im sively fast.

Before I received a promised benchmark results from STSC, I formed several informal tests of my (see Figure 1). The first looked at o ing, which can be done two wa APL—by e loop, as is also done in B or by creeting e "vector" of a certain ber of 1s end then using the shape tion ρ, which returns tha size of an Looping from 1 to 5,000 took 92.7 onds, while the vector method t mere 0.3 seconds. Keep ln mind that ing is seldom needed in APL.

In a second informel test, I calcu the cumulative sum of all the int from 1 to 5,000. Here I used tha e sion +/ιN, which creatas a vector o gressiva whola numbers from one and than sums the numbers in the v APL*PLUS/PC sprinted through intagars in 3.7 seconds.

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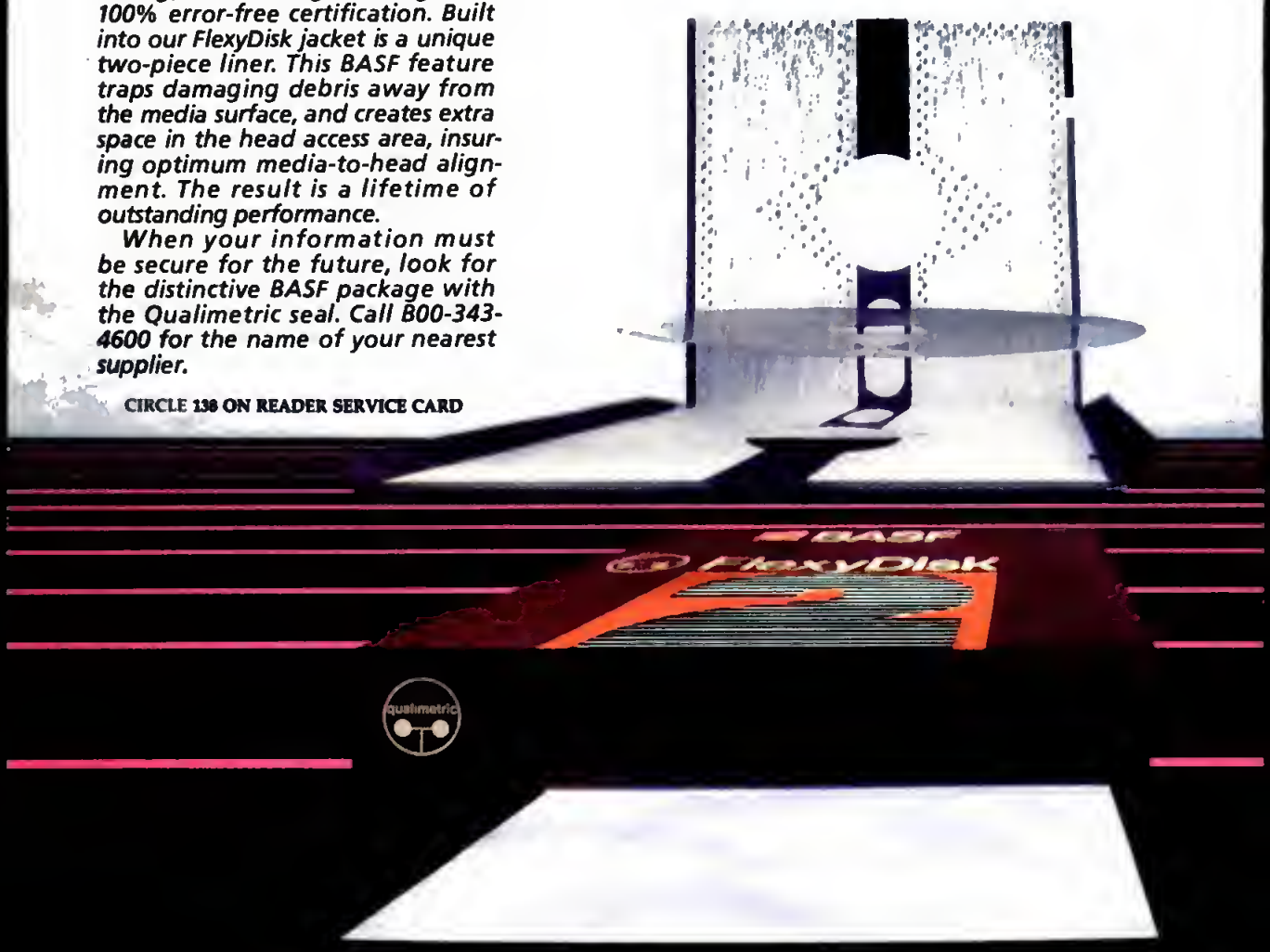

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-Pie Order

icb Paulson at STSC sent me the lts of several benchmark tests be and olleagues performed to compare APL ASiC on e PC without an 8087. He sured trapped elepsed time without ing. Figure 2 shows the results for loping the mean, stendard devietion, imum and minimum of a series of N ng point numbers. BASiC chugged gh in 156.6 seconds, while PLUS/PC took 29.1.

igure 3 compares APL and BASiC in ng three series of numbers. STSC the Quick Sort from Dwyer and hfield's BASiC ond the Personol puter, whicb is reputed to be the fas- sorting routine evaiiabie in BASiC. re 4 shows the APL programs i used rt the numbers. It took BASiC 120 nds to sort 500 numbers. APL*PLUS/ mply blew BASiC awey by arranging 00 in perfect order in only 1.2 sec-

FORMER BASIC sers often grow a bit rhapsodic when describing some of APL's most useful features.

. Here again APL doesn't need e pro- . It can do the sort in two sbort steps mediete execution mode. The raw bers are entered as e vector and ned the name A. Then the upgrede itive is used by entering A[⍋A], and st before you take your finger off the key, the entire sort is done.

ormer BASiC users often grow a bit sodic wben describing some of APL's useful feetures, and with good rea- It is crammed to the gunwales with ies thet make BASiC look like a

rrays in APL do not have to be red, as no storage need be alloceted vance. Arrays of two or more dimen- are defined wben first used in e pro- . and can be easily resbeped et any under program control.

IT ALLOWS the PC to function either as a dumb or a very smart terminal.

There are dozens more primitive operetors in APL than BASiC. These operate on entire arrays simultaneously without requiring time-consuming loops. This epplies to multidimensional matrices as well as scalars and vectors.

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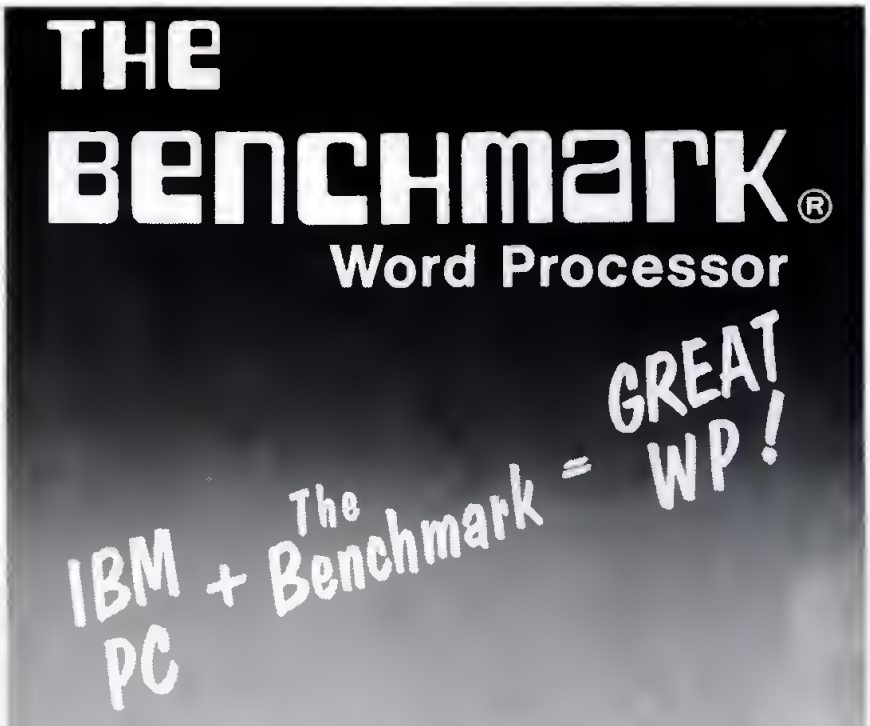
Lines of code can be given mnemonic labels that remain constant during renumbering. This is very useful in GOTO situations and in the few cases when you need to loop. Line numbering is simple and efficient; to add a line between [1]



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and [2] you simply use [1.1]. To insert e line between [1] and [1.1] you use [1.01] and so on. These are eutometically renumbered into integers when the program is completed. In program listings, comments are iabeled and eutomatically offset one spece to the ieft for easier reeding. Varieble names can be up to 77 characters long. The names for character strings and numericai variebles do not have to be distinguished.

Errors Made Easy

When e program bombs out, APL not only gives the error message and prints the program line, but points to the exact location where the problem was encountered. BASIC users often have to puzzle this out for themselves.

THE MANUAL could stand improvement, especially for beginners.

Users can be assigned different p word numbers for security or accoun purposes. There are many other secu feetures, such as locked functions and eutometic expunging or modificatio workspaces if someone other than specified user loads it.

Experienced APLers will be happ heer that APL*PLUS/PC is a very c plete implementation of the language the APL operetors are included, and t is e number of significant STSC enhe ments. Among these are its shared system, the evailebility of over 100 tems functions, e powerful forme end exceptions handling capacity, the ebility to create and use onscreen dows.

THE "primitive" function are very powerful too that allow you to wr programs using extremely concise co

The peckage does have several s comings. As mentioned above, the m al could stand improvement, espec for beginners. In addition to the prob hed installing the chip, I couldn't any information on how to assign defined entry sequences to the 30 eble function keys. I eventuelly lea thet this is covered on the reverse si the disk, but there is no explenetion manuel of whet is on the disk.

The manual is elso short on inde A lerge section on the more than 10 tems functions has no separate tab contents. And there is elmost nothi the manuai on APL's powerful fo function.

Alien Strokes

STSC does provide e sturdy iami guide to the keyboard's new conf tion of Shift, Ait, and Ctri key funct But perhaps it should make evaiiable of covers to fit over the actual keys beginners, using these elien keyst can be an extremely slow process.

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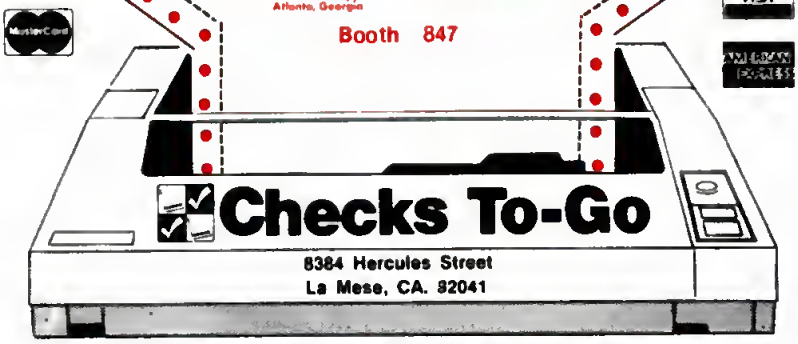

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eletion
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Delete line
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Delete to bottom of page
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earch
Forward or backward
Query mode
Same string option
Ignore case
option

Replace
- Forward or backward
- Query mode
- One time or many times
- Same string option
- Ignore case option

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should elso issue e handy reference guide listing the operation end function of these keys.

STSC seems committed to publishing the most comprehensive APL package on the market. Enchancements are issued regularly, and ere offered to users et e nominal charge. Future releases are expected to include e keyword version based on English words rather than APL symbols, for users who do not want to install the charecter chip or deel with the alphabet of symbols. STSC is elso working on e Help command that will provide on-line progremming essistance.

APL IS NOT simply an expensive calculator.

STSC hes e steted policy that there will be nothing that BASIC can do that APL*PLUS/PC cannot do equally well. Music and color graphics functions and routines ere scheduled to become e part of the system, end the entire kit will soon boxed end sized to resemble IB manuels.

Under consideration for later rele are e finencial planning system w spreedsheet capability, a graphics plotting peckage that will also includ screen management system, and a file manegement interface system users who know nothing ebout APL. Inexpensive stetistical program may s be issued. Software writers will be gle hear thet STSC will soon put a run-t version of APL on the market for appl tion development. While applicati with this system will run under APL, users will not heve eccess to the langu itself.

The existing APL community may swarm to APL*PLUS/PC like bees to h ey. The system should elso appeal to entists, engineers, actuaries, mathem cians, stetisticians, finance experts, anyone else who wants an extremely

MANY USERS feel APL is the most advanced general purpose computer programming languag available today.

and powerful computational capabili his fingertips.

But APL is not simply an expen calculator. Meny users feel it is the advanced general purpose computer gramming language available today. gramming in APL is easy to learn; enough guidance, most APL begin can function productively after one sion with it. And the educational m rials provided by STSC are excel

My own personel reaction was on awe end delight. Even without an co-processor, APL*PLUS/PC t formed my PC into a lightning-fast p erhouse. STSC is to be congratulate its sterling implementation; APL*PL PC is a major accomplishment that influence the future of microcomput

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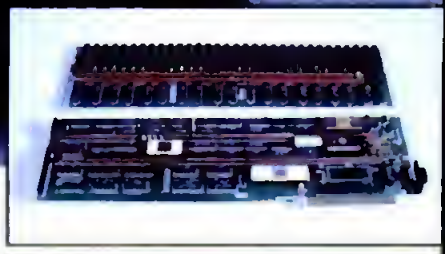

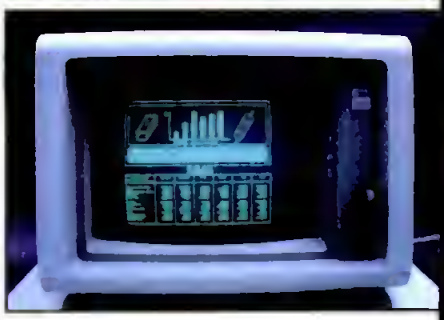

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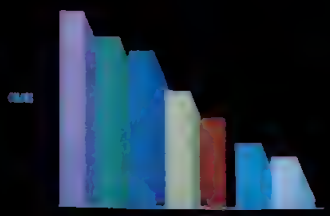

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The most controversial thing about 1-2-3 is its logo. The reverse-image design can trick your eyes if it's not reproduced or printed with the proper shading; the logo then looks like a phrase written in Arebic script. But despite its sometimes misunderstood nature, this logo symbolizea a product with e new combinetion of capabilities. The functions integrated in

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1-2-3 and its reasonable prica are presenting e real chellenge to the esteblished leaders in the 'Calc software market.

Counting the Ways

1-2-3 is first a spreadsheet. All of its other functions rely on its spreedsheet format. As a spreedsheet, it is excellent. The program can hold up to 440K of deta. It integrates a large library of functions such as present velue, future velue, amount of peyment, stetistical formules, and logical comparisons. The spreedsheet can be designed with two separetely scrolling windows, globel and special labels, end write-protected cells. The width of each column can be separately defined. *1-2-3* compares fevorably with any other spreedsheet on the market, but the spreadsheet functions alone are less than one-third of the program.

THE spreadsheet can be treated as a visual database.

1-2-3 edds the power of a database manegement system to its spreadsheet's number manipuletion capebilities. Under this functlon, the spreadsheet can be treeted es e visual detabase. The horizontal rows in the spreadsheet become detabase records. The verticel columns become the key fields. The software can manipulete up to 2,000 records with 256 fields if your system hes sufficient RAM.

In this information management mode, the program can sort the records (rows) using one or two fields (columns) es keys in logical And/Or combinetions. It can find and extract records with specific characteristics and can displey or print portions selected from the original records.

This clever combinetion of a spreadsheet and e visuel detabase provides power, flexiblility, and ease of use; on top of this, Lotus decided to edd one more feature to really catch your eye. *1-2-3* elso includes e grephics program that is el take date that has been created b spreadsheet end manipuleted by the base manager and display it as chart graphs on e plotter or graphic print

Lotus does not cleim to have incl e word processor in *1-2-3*, but it cert can function like one. The spreed entry mode allows you to type text out being confined to the size o spreedsheet cells. You have to wet line width and perform line feeds to down e row, but text entry and mani tion is very easy.

Simple editing commands anc spreadsheet copy and move comm will work es well with text as the with data. The printing commends vide ell of the desired features su headers, footers, and page numb These capebillties will at least ellov to easily include text descriptions your spreadsheets. If *1-2-3* is the onl gram you own, you can write e grea before feeling the need to use a sophisticated word processing prog

Each one of the three mejor func in *1-2-3*—spreedsheet, database ma and graphics—has the quality of en vidual software peckage that coul for close to *1-2-3*'s total $495 retail tag. However, the combination of functions doesn't tell the whole st what this program provides. It is s cant thet the biggest file on the *1-2-*

THE spreadsheet's entry mode allows you t type text without be confined to the size the spreadsheet cell

tribution disk isn't e program so mu e huge collection of Help and explan stetements thet are ready to take the of the user. These eids are combined a flexible command format to make easy end pleasant for both novice experts to use.

The Lotus peckage includes e

erlay that fits nicely on the PC speciel nction keys. It describes the functions each key. This providas a fast sourca of lp to supplement the command de-riptions that eppear on the screen above e spreadsheet and the Help screens.

Now thet you hava an overviaw of the nctions included in *1-2-3*, let's see how e pieces fit together.

edication to the PC

1-2-3 is not a warmed-ovar program at could ba run just es effectively on an bit microcomputer system. It is written essembly lenguege especially for the M PC and it takes full edventege of the 88 processor to provide very fast per-rmance.

The progrem can use up to 440K of AM for worksheet storage and opera-

A HUGE collection of Help and explanation statements is ready to take the hand of the user.

n. It requires a minimum of 128K and o double-sided disk drives to run. It es tha special function keys and the Alt pability of the PC keyboard. The special yboard overlay is anothar sign of the rk done to integrete the software with e IBM PC.

1-2-3 will function with a PC equipped th tha monochroma board, but it can-t display charts end graphs before thay creeted on peper. Only systems that e the color/grephics edepter can dis-y charts and graphs before they are nt to a printer or plotter.

An impressive feeture of the program he ebility to distributa its video output an run on e system equipped with both monochrome and color/graphics ards. A monochrome screen can dis-y the spreedsheet while the graphics nitor is displaying e chert or graph cre-d from the spreedsheet. Then, like a gician, whenever you chenga the data he spreedsheet, tha program will meke immediete change in the graph. I pra-

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dict thet this data-grephing capab with immediate feedback is going to s lot of color/grephics boards and mon because 1-2-3 makes impressive us responsive computer power.

This packege does not ellow diffe sections of the spreedsheet to be pleyed in color. Use of color is limite the charts end graphs.

WHENEVER you change the data the spreadsheet, the program will make a immediate change in graph.

This means thet the use of a hard system cen benefit program opere However, the program certeinly perf ed very well on e system with two disk drives.

The progrem makes good use o cursor to designete both commands data ceiis for ection. It is designed t the arrow keys on the keyboard to co the cursor, but this method of co mekes it difficult to use the keys o number pad to enter dete. After you the program for a while, you can't but wish that someone would integr mouse with 1-2-3. Using e mouse s neturel both beceuse it would com ment the program's design end w eliminete the need to make double u the PC keypad. Mouse breeders, are listening?

Spreadsheet Commands

Software designers perpetually the problem of meeting the needs of novice end expert users. Novices sh be provided with menus to guide ections and to allow them to beck-off an improper step end try again. Exp however, want to use single key mands or speciel function keys to r through the program as quickly smoothly as possible. They have no of menus end consider them e barri responsive use of the program. euthors of 1-2-3 understend the nee

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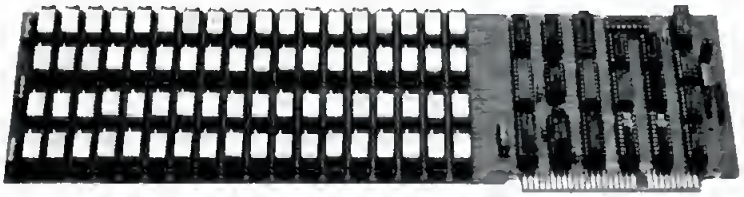

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users in both positions and built alter tives into the program that can sat everyone.

Almost ell of the 1-2-3 spreadsh commands are familiar to users of pres 'Calc programs. When you key in command sign (/), the program displa list of commend words above the h zontal bar of the spreadsheet. 1-2-3 is ferent beceuse the commends can eddressed in two ways.

If you are familiar with the comma you can simply enter the first letter in name of the command function you w end the progrem will do your biddin you are not familiar with the comme you can move e reverse video cursor c eech commend word and e one sente description of the commend or the a cieted sub-commands will appear on second line of the screen. When you p tion the cursor on the command went, you only need to hit the Return to call it in. After you heve selecte function, by pressing the F1 key, you bring up an appropriete Help screen f the more than 2,000 special screens are e part of 1-2-3.

This combination of menu-driven commend-driven operation is equ pleesing to new and experienced us You can mix the two methods of op tion in e series of commands. You enter e single letter to get to the first eral functional aree you want; once are there, you can exemine each optio

ADDING a mouse would free th keypad to be used exclusively for enterin numbers.

the sub-menu and select your choice the moving cursor. I quickly learned few command letters I used most quently, but I still used the menus cursor to select some functions even I was quite familiar with other parts o program.

A strong feeture of 1-2-3 is the ab to access disk and file commands wit exiting the program. You can reviev

ctory of a disk and even erase and me files. This is a real salvetion when heve created a large spreadsheet and find thet there isn't enough spece on ile disk to save it. 1-2-3 ellows you to the disk commands to find or create space without first dumping the e program.

THIS ombination of menu riven and command driven operation is ually pleasing to new nd experienced users.

nother feature is the ability to create oard macros. When used with the Alt any of the 26 letter keys can hold for- s, special commends (such as return specific cell location), or any other strings thet you might use frequent- his mecro capability, combined with of the function keys, makes 1-2-3 e fast end useful tool for programming ific epplications.

fany spreadsheet programs make a roduction out of using the replicate mand. Lotus has simplified this com- d considerably. Each time you dupli- a formula with most spreadsheets, must decide if each part of e formule n absoiute factor, which is always regardless of the physical position of ormula, or e reiative factor, which is ied according to the position of the ula. 1-2-3 asks you to make these ions only once when the formula is developed. Any replication will be istent with the initial decision: abso- addresses are retained while variable esses are changed to match their new ion. This epproach greatly simplifies ction that requires the greatest space plain in the manuals of most 'Calc rams.

keeping with its philosophy of ing e dual approach to commands, 1- rovides two ways to designate cells plication, movement, or inclusion in mula. The first epproach, found in spreadsheets, is to use cell designa-

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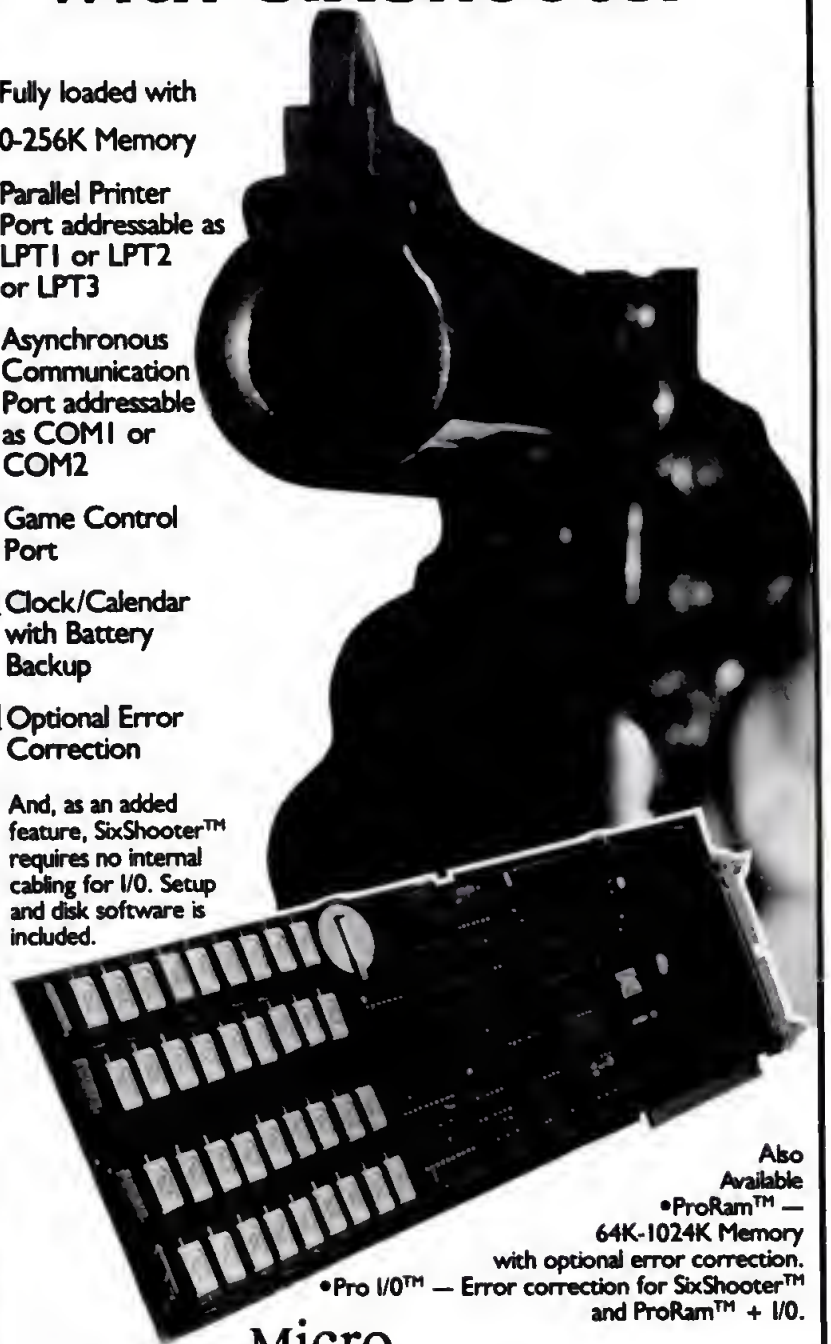

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R, RP		x	
1118		x	
2106	x	x	
2119		x	
2210		x	
2220			x
2440		x	
2441	x	x	
3468		x	x
3903		x	
4137		x	
4562		x	x
4625		x	x
4626			x
4684	x	x	x
4797		x	x
4835		x	x
4952			x
4972		x	
5695	x	x	
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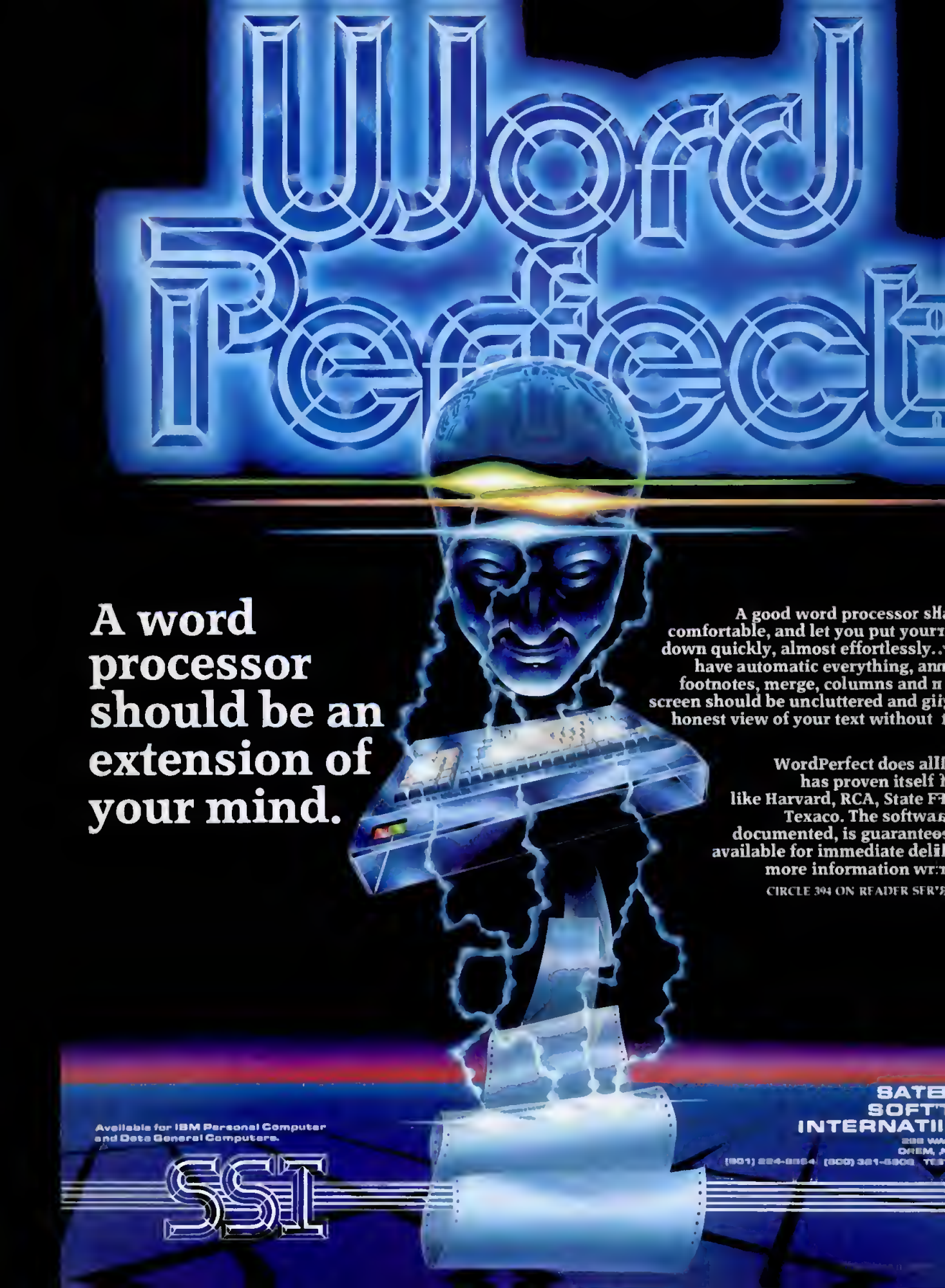
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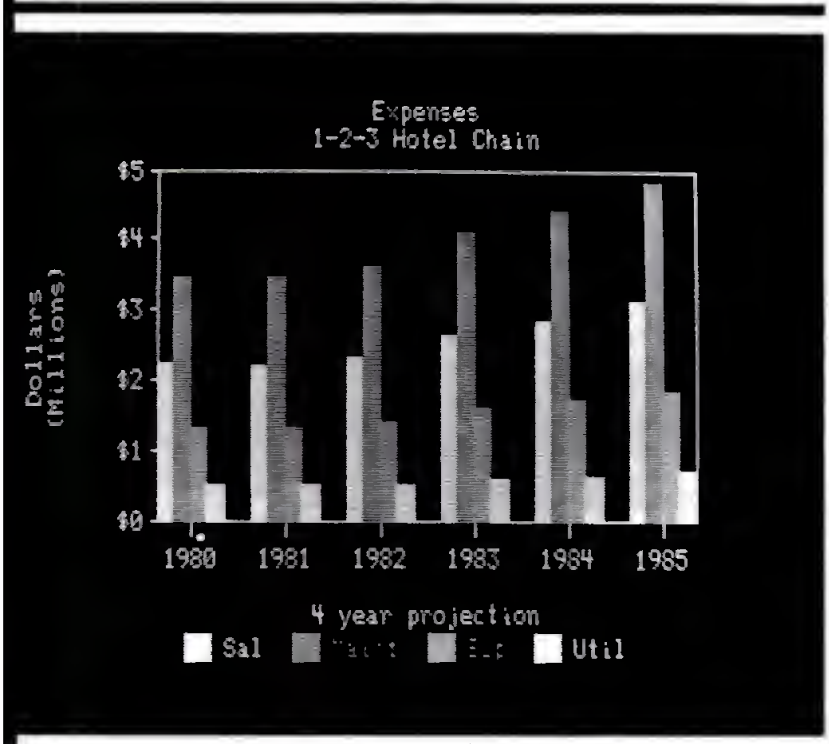
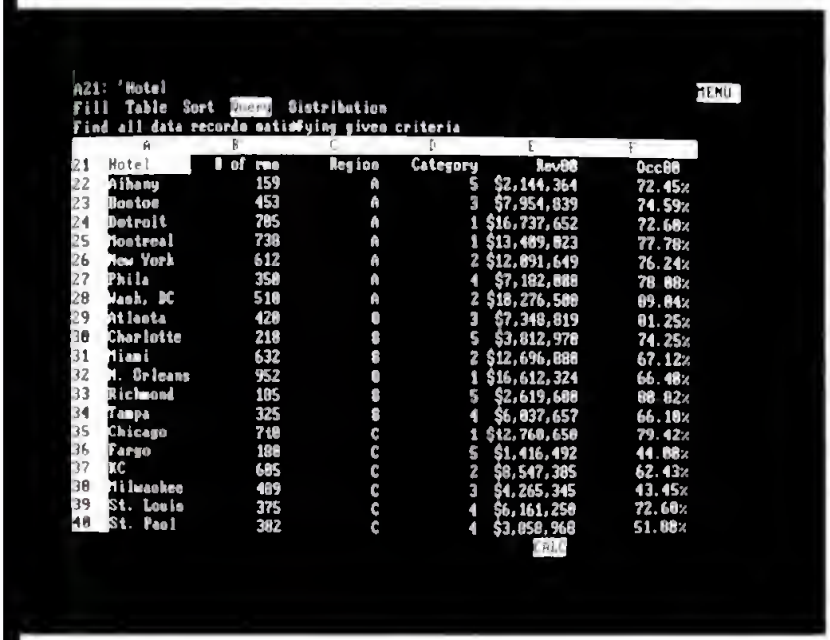


photo demonstrates how a 1-2-3 bar chart looks when it is displayed on a ochrome monitor hooked to the PC's graphics card. If only the graphics card is nt in the system, this chart can alternate with the spreadsheet. If both the IBM ochrome card and the graphics card are in the system, 1-2-3 will automatically the spreadsheet to the monochrome monitor and send the chart to the graphics itar. A change in the spreadsheet will cause a change in the bar chart within one o seconds.



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the three lines at the top of the 1-2-3 spreadsheet. The first line tells the location e cursor and it displays the contents of the cursor cell. The second line is a menu tion. The reverse video selection cursor can be moved between menu items with rrow keys. Alternatively, the first letter of each selection can be entered as a mand. The third line gives an explanation of the highlighted menu selection. It contain an explanatory sentence or a listing of additional subfunctions.

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tors (A1, B7, and so forth). The second approach involves the use of the cursor again. The cursor can be used es a pointer to show the program which cell or block of cells you are interested in. This ebillty is particularly useful for designeting e block of cells to be replicated or moved. You can run the cursor around the block of cells, "painting" them with reverse video. This makes the tesk easy and fast for you. Adding a mouse would enhance the operation of the program and would free the keypad to be used exclusively for entering numbers.

ALMOST ALL of 1-2-3's spreadsheet commands are familiar to users of present 'Calc programs.

Data Base Commands

In the *1-2-3* tutoriel, e detabase ls defined as a range of cells thet stores lnformatlon organized lnto records and fields. The records are the horizontal rows in the spreadsheet and the fields are the vertical columns. The individual records in the *1-2-3* database are not related in any way; they are not "owned" by higher-level categories of records.

The fields can contain a mix of any alphanumeric characters. Sorting and selecting can be performed using any one or two fields at a time. The fields can be compared, added, subtrected, or manipuleted in other weys. This errangement makes it easy to change the data in the database and it is perfectly consistent with the "what if?" epplicetions of spreadsheet operation. It is not the preferred method of organizing fields for fast sorts and retrievals, but because of the program's practical llmits on the size of the datebase and lts assembly language programming, the speed of detebese operations in *1-2-3* is very good.

The two mein databese ections are Sort and Query. The Sort commend can arrange the database in either alphabetic or reverse alphabetlc order by using one or two sorting fields. If you plan lt p erly, this command can accomplish r than elphebetizatlon. It can group rec according to different categories. By p erly designing the fields to be use keys, you cen give the records the ec elent of cross index tabs that can be sc swiftly by the program.

As an example, suppose you h database made up of a list of empl names end personnel data. Each r with its data would be a horizontal re in the database. One vertical field in record could contain an M or an S to cate married or single. Another could contain an F or M to indicate The Sort command could work on t two fields very qulckly to arrange records eccording to maritel stetus sex.

The Query command can opera two weys. In the simple Find ection program will find the record or rec with fields that match the criterion will highlight them with reverse vid more complex Extrect action will d cete the matching records into a spec designated output range. This ou range can accept all or just a selected of the original record; the items in the put renge do not have to be in the order they were in the originel s records. The output range area can be printed or saved in a separate file.

EXPERTS want to move throug the program as quick and smoothly as possible.

capabillty provides e useful kind of r generator.

Under the Query command, the cen be searched in a number of diff weys. It is possible to use powerful ean "And/Or" logic formulas to com fields, and also to choose those fields that are larger than, smaller tha equel to a derived or constant fa Wildcard symbols, the ? used for a s character end the * used for mu

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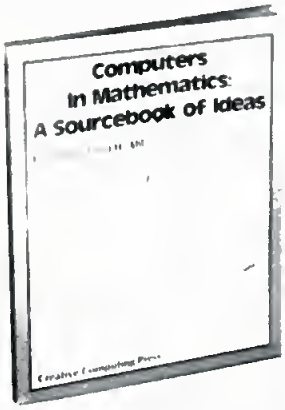

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you can salect a portion of the origi
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And Hayes is providing the communications link: A first-rate telecomputing system that combines an intelligent RS-232 connect modem with a sophisticated, easy-to-use communications program.

The Smartmodem 300. Think of it as your PC's telephone. Just plug it into any phone jack, and the Smartmodem 300 sends messages to and from your computer, at 300 bits per second, over ordinary phone lines. Goodbye isolation. Hello world.

More than any other peripheral, a modem vastly extends the usefulness of your IBM. So it's important to get the best modem for your money. (One with a limited 2-year warranty.) The Smartmodem 300 is a wise choice. Far superior to acoustic coupler modems, which connect to the telephone receiver. And it's so easy to use.

It dials, answers and disconnects calls automatically, operating with rotary dials, Touch-Tone* and key-set systems. It works at full or half duplex, which simply means that connecting to a time-sharing system, while a big deal, is no big deal to do.

Indicator lights let you see what your Smartmodem is doing, while an audio speaker lets you hear it. (Is the remote system down, or was the line just busy? This way, you'll know.)

Now all these extras aren't absolutely necessary. We could have gotten by without them. But at Hayes, we're not satisfied with just "getting by." That's why we made the Smartmodem 300 well, smart. You can even program i And we've even provided one for y

Announcing Smartcom II.™ The communications program designed Hayes specifically for the Smartmo If ever there was friendly software, Smartcom II is it!

The first time out, you'll be creat messages, sending them, printing th and storing them to disk. Simultane

Likewise, when you're on the re ing end. Only you really don't need be. With Smartcom II and your Sm modem 300, your computer does it completely unattended! That's espe helpful if you're sending work from home to the office, or vice versa.

But it's just part of the story. For ins before you communicate with anot system, you need to "set up" your computer to match the way the ren system transmits data. With Smart II, you do this only once, the first ti After that, the information (called meters) is stored in a directory on th Smartcom II. Calling or answering a tem listed in the directory requires a few quick keystrokes.

You can store lengthy log-on seque the same way Press one key, the Smartcom automatically cutes a whole string of numbers to co you to a utility or information servi

And if you need it, there's alway "help." Even while you're on-line, t screen will display explanations ab

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e to TELEMAIL! Your last access
sday, Jan. 4, 1983 11:07 AM.
these bulletin boards:
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message or parameter that will
n your way in no time.
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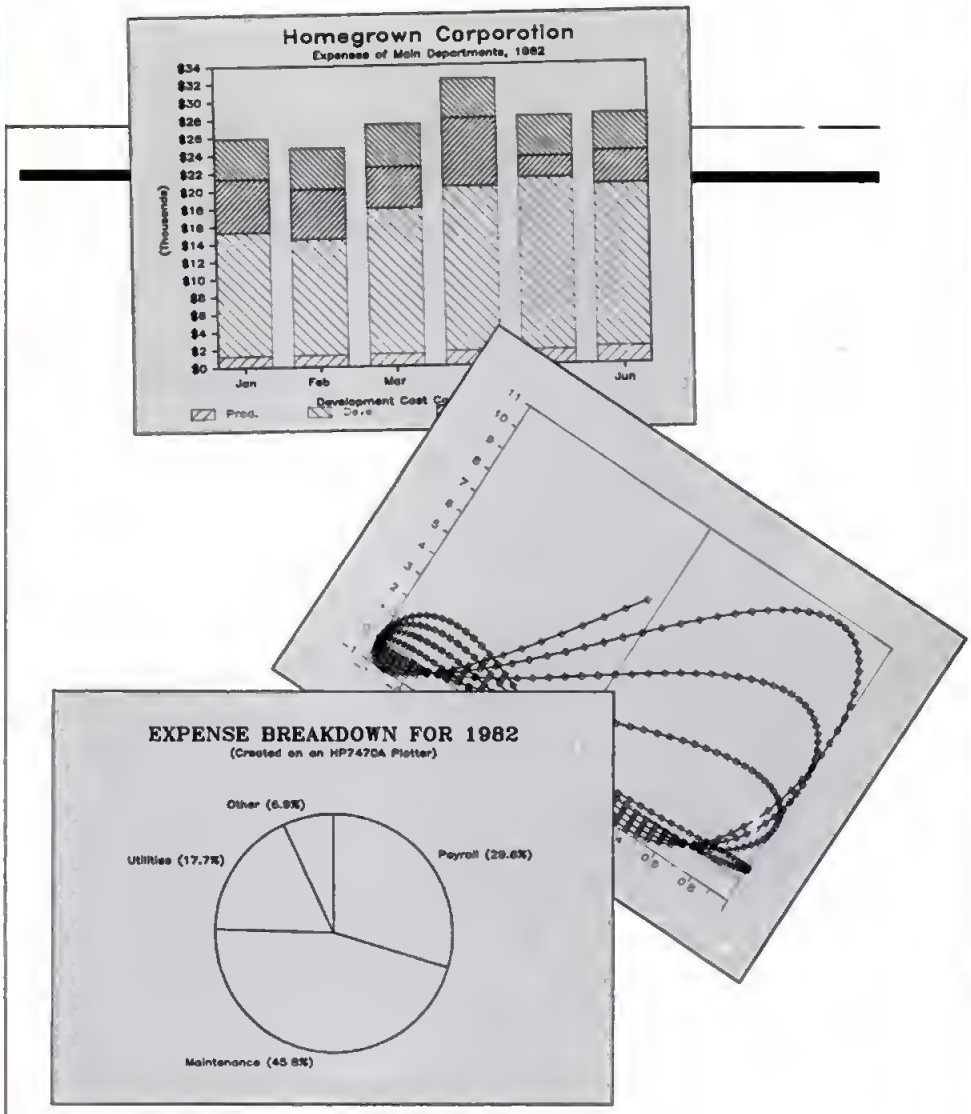

Figure 1: These charts, all produced by a Hewlett-Packard 7470A p otter, illustrate the versatility ond graphics capability af the Lotus 1-2-3.

It mey sound like e confusion of terms, but you have not seen e PC perform pretty printing until you see e plotter print text under the control of *1-2-3*. The program can direct a Hewlett-Packard 7470A plotter to print beeutiful charecters in roman, block, gothic, and italic print styles. The printing can be vertical or horizontal and be pleced to identify eech mejor feature of a chart. The cherts and grephs that result from this combination of IBM and HP hardware and Lotus software are good enough to meet the standards of any corporete or government presentation (see Figure 1). The ebility to chenge the dete and immedietely see the results offers e whole new method of corporate decision making and problem solving.

Challenging the 'Calcs

1-2-3 is e powerful and impressive program. Marketplece rumors say that VisiCorp rushed its introduction of *VisiOn* to meet the challenge of *1-2-3*. There are many similarities to be seen between *1-2-3*, *VisiOn*, and Apple's Lisa system, but *1-2-3* is available now for the PC et e reasonable price.

The eppearance of integrated products like *1-2-3* end *VisiOn* will certeinly heve an impact on esteblished programs. Indeed, Lotus has made it easy for users of other software to make the transition to *1-2-3* by providing utility programs thet can read and use the date in *VisiCalc* end *dBASE II* files. But the challenge of competition can bring surprising efforts from this industry. We should see even more innovative softv.are for the PC in the future. For now, Lotus has set e new level of cepebility and performance that others will try to reech. */PC*

APPLICATIONS/COLIN COVERT

Conniving on the part of employees helps prod this financial giant to adopt and adapt the PC.

BankAmerica Plugs In To PC Power

One of the nation's leading financial institutions, BankAmerica Corporation, headquartered in San Francisco, had a difficult year in 1981. The firm's balance sheet made for gloomy reading. Earnings fell dramatically from the year before, sinking more than 30 percent below the record $645 million earned in 1980. With interest rates rising like yeast, business was moribund.

In his annual letter to stockholders, president Samuel H. Armacost was candid when he wrote, "We are in a period of transition that involves some painful adjustments for BankAmerica."

COMPUTERS were being bootlegged into the company.

Facing Challenges

One of the challenges facing the giant bank was to take advantage of technological advances promising to offset rising costs through greater productivity. The company could enlarge its convenience, response time, and the caliber of service, but the initial investment for these state-of-the-art systems was steep. BankAmerica was, in the words of one industry analyst, "laying new foundations for the long haul."

The IBM PC was a cornerstone of that new foundation and BankAmerica began ordering the machines by the hundreds. "Our entire executive staff, from Sam Armacost on down, now has IBM PCs," said one BankAmerica insider.

Computers are nothing new at the organization. It's 17-story San Francisco computer center occupies an entire city block and maintains a vast electronic library of financial information on every conceivable aspect of the world economy, including the exchange rate of the Swiss franc to the price of Florida orange futures. The "Main Brain" in San Francisco has 20 counterparts worldwide. These have been spinning their tape reels, and improving the effectiveness of the institution's operations for decades.

According to Bill Lee, the head of BankAmerica's International Communications Office, the computer revolution arrived at the bank late in 1981 when a stream of independent-minded employees began smuggling micro computers into their offices. "People were buying them as stationery," Lee recalls. "They were ordering them on their own authority and putting them on the expenses of the company as paperweights and office supplies. We didn't budget for them last year and nobody knew what channels to go through to buy them. Rather than go through our data processing department, each individual office would budget for them as 'miscellaneous supplies.'"

BANKAMERICA began ordering the machines by the hundreds.

Lee continues by noting, "The

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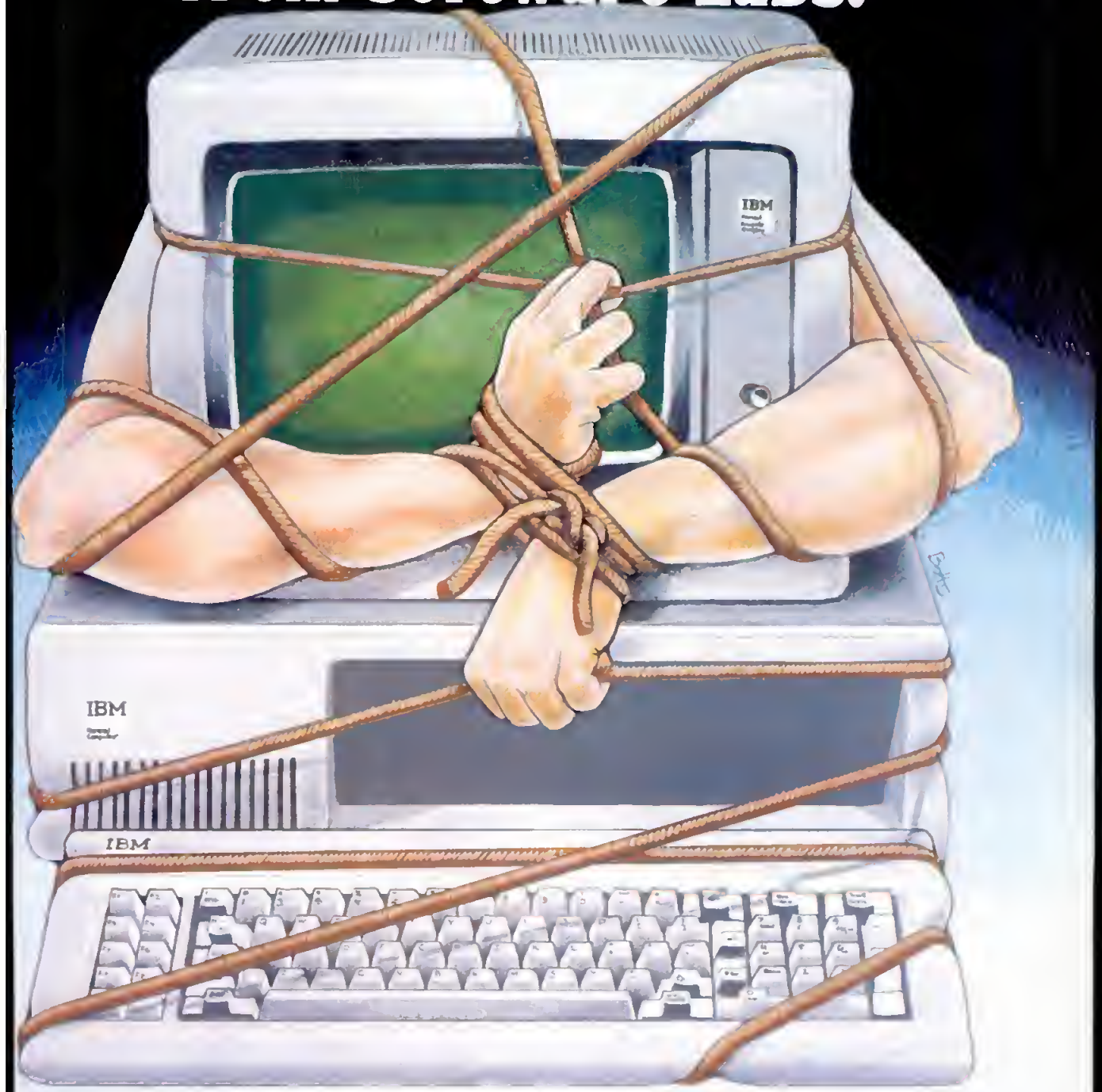

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chasing dapartment didn't catch on to what was heppaning until tha and of lest summer," ha axplained. Someone noticed a lot of suspiciously expensiva papar was being bought from Bey Aree ComputerLand stores. Aftar some datec-

THE ELECTRONIC message operation alone saves the bank several million dollars a year.

tive work, tha purchesing departmant discovered that computers ware baing bootlegged into the company. The discovery prompted e decision to allot e budgat for computer acquisition—and in tha interest of uniformity throughout the bank's communications system, the IBM PC was selected as tha firm's genaral purposa office computer.

Adopting the PC

Tha benk's decision to adopt tha PC as its standard was clinched es much by its performanca in competition with other micros as by IBM's reputetion. "You have to realize that we hava Applas, we hava DECs, we heve Altos, wa hava avery type of personel computer that axists—and some that don't evan exist in the reteil markatplaca. In an organization this siza, you heve to buy everything," Lee seid, "because you don't know which one is going to be a winnar. So when IBM came out with its micro, we got that, too. But now it's claar tha IBM PC is bacoming the dominant antry in tha market."

The first officielly purchased IBM micros began to arrive at tha benk in the fall of 1981. "Wa bought some of the first PCs on tha markat," Lea seid proudly. "Now thay're exploding lika locusts inside tha bank, end they're performing every imaginabla task. A lot of the machines were originelly justified on tha cost and productivity savings thay would afford through the use of VisiCalc."

The machine's chameleon-like versatility soon earned it a niche in virtually avery dapartmant in tha benk. Tha company usas PCs for new banking services, as wall as intarnally to track stock issues and portfolio management. Bill Lea has one of the units beside his desk. He considars it his touchstone to tha bank's vast array of finenciel information.

First thing avary morning, Lee logs into the benk's globel data network to get the day's electronic meil from Hong Kong, Singepore, London, or Frankfurt. Bank productivity experts have calculatad that the electronic messege operation alone saves the bank severel million dollers a year. "Tha improvement in communications coordinetion it affords is invelueble," says Lee.

Lee is e true beliavar in the IBM PC. Ha has threa PCs in his home, and uses them to maintain communication with the bank on weekends and evenings, sending work back and forth among offices around the world.

Various Applications

And lika thousands of businassmen nationwida, Lee uses tha VisiCalc alectronic spreadshaat almost every dey in soma mannar, and hails it as a godsand. "You cen change your assumptions, projact tha worst case and best casa, change the inflation factor and see tha result. If markat panatration is not as good as wa enticipated, or bettar then we enticipated we cen determine the net effect. Wa can also datermine how many more people it takes to meke the product or how much more floor spaca it may taka to house the production group. You can put all thosa variablas within ona modal, change any one of them, and see the net result." Lee often pushes the program beyond its eccounting functions to simulata the oparations of the bank's worldwide communications network.

In eddition to systems modaling, Lee follows enother growing axecutiva trend by using the PC to do much of his own word processing. "I have WordStor end Volkswriter on tha unit, in addition to VisiCalc and Supercalc. So I rough-draft letters or memos end then sand them to the secretarial pool. I can bang out a letter faster that way then if I was forced to sit down and write it longhand. Basidas, it's hard to read my handwriting. I'm a physicist and an engineer," he seid.

Calculetions formerly done with the aid of tan-key adding machines or programmable calculetors and spreadshe are now dona routinely on tha PC. "
now hand financial data on funding p
posals and tha lika beck and forth on di
we print out a copy to go with the prop
als. However, most of that work is n
passed back and forth between dep
ments on VisiCalc models," expla
Lee.

Besides streamlining the institutlo
intarnal bookkeeping, anelyzing the p
formence of investments, and speed
recordkeeping activities, BankAmaric
using micros to improve customer
vices. Lee states that ona innova
application could turn the home of ev
computer ownar into a branch bank.

"You can run a lot of banking servi
in tha homa; in fact, we're doing that n
It's in a pilot stege with employees
rently, but we're going to go public wit
soon. Evary service performed by a
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dona at home on your personal compu
You can pay your bills with it, tran
money between accounts, detarmine y
sevings and checking balances. In
future, we'll significantly cut the cos
transactions by reducing the amoun
papar-shuffling thay demand, and
creese the amount of alectronic
vices."

Computer services can be customi
for tha more complex needs of l

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depositors, too. "Customers with
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require e lot of servicas lika astate p
ning and special business transacti
Thay want a lot of parsonal services
quick access to e lot of information,"
noted. Whan such a customer come
for a financial consultation, the ba
can sit that person down by the desk
run through tha figures on tha scr
"Using the PC, we're eble to give the
tomar a battar undarstanding of wh
teking placa in the market. This little

esit thare and actuelly sbow you "s going on tha markatplace. To h it is to understand"

rill Lynch

Tearing one of his other bets, Lee as as e consultant to Marrill Lynch, h is in tha midst of an ambitious uterization program. Marrill Lynch llish on tha IBM microcomputer se its information-managing potenmay make it the most important nca in stock-trading tachnology the ticker tape. "The company is ling soma 10,000 PCs in brokarage s across the country," Lea reported. ants ona on avary brokar's dask." microcomputars et their disposal, rs can handla scores of custom- eccounting projects end work out idual treding strategies.

a savings in tima and improvamant vice provided by individual micro- utars should anabla brokars to make commissions. A brokar with e computer can eesily run off 500 letters to his or her best clients and maka them all look as if they were individually typed. "It givas you a greatar raward for your time," Lee seys. It should ba noted that a dalay of 5 or 10 minutas can make e great deal of diffarenca to a stockbroker.

USING THE PC, we're able to give the customer a better understanding of what's taking place in the market.

Lee discounts tha importanca of intuition and inside gossip to a broker's success. "Intuition is only a function of informetion," he declared. "Tha fastar, cleanar end more dateiled your information, the better your intuition to maka e decision. The computar anablas you to sea things you couldn't see before." Gossip and reading batween the linas in tha Woll Street Journol are important, too, Lee grants, "but wban you want tha information before you to do a financiel technical analysis of e situation, then you need a tool that does that analysis at the push of a button." Because the buying and salling of stocks involves tha transfer of millions of items of informetion—markat quotas, status reports on trades, naws itams, and fluctueting aconomic indicators—brokers with computers at thair disposal sbould have a distinct edvantaga ovar their less well-equlppad colleagues.

Neverthelass, by taking the laad positlon ln installing micros, "Marrill Lyncb is doing somathing gutsy," Lee says with edmiration. "Tha company decided to maka its move in technology when the markat was down and activity was low so it could put new, innovativa procassas ln place to handla tha crunchas thet most inavitably come in the future. /PC

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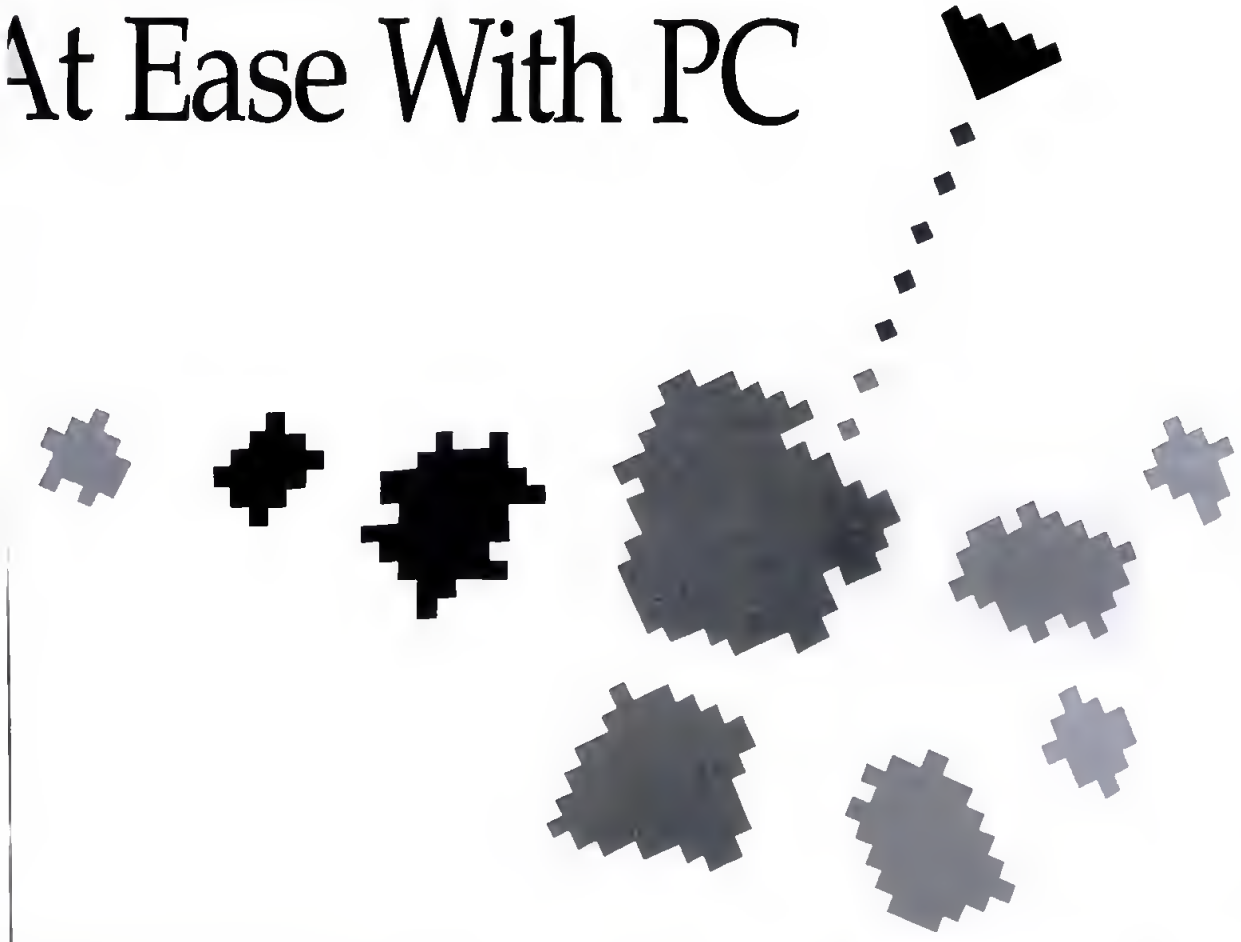
CIRCLE 294 ON READER SERVICE CARD

ARCADE/COREY SANDLER

peek into the PC Arcade this month confirms that me designers are wells of inspiration but a little ieven in the execution of their ideas.

At Ease With PC



PLE PANIC
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Price: $29.95

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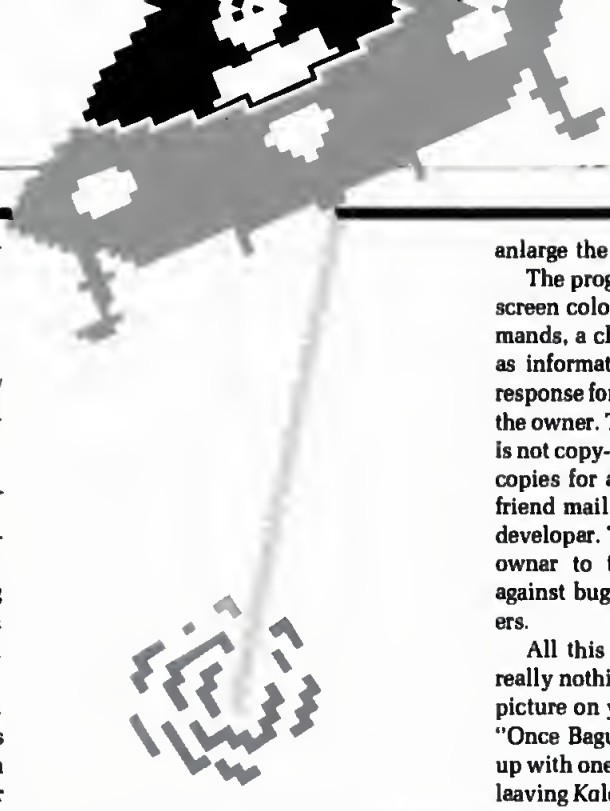
and describe this game without ding silly: You ere being chesed ugh a multi-level mansion by little es with feet. You can dig boles in the floor to trap them or climb ladders scape them, but sooner or leter, it es down to you or the apple.

es, Apple *Panic* is e pretty dumb . It's elso fun to play and pretty to watch. The game is not new; Broderbund Software hes meneged to squeeze extra life out of this product by converting it from its very popular Apple II origins to run on the PC.

Apple *Panic* is a welcome change from the endless stream of shoot-em-ups in spece, but it still bas an edge of violence. Relentless ettackers they mey be, but those little epples ere cute fellows replete with legs and probably mommies and deddies. And your goel is to pound tbem senseless with a little hemmer once they get caught in the bole you've dug for them.

Pounding an apple through the bricks scores 100 points per level. If the unlucky fruit falls two floors, you get two points. If you reach one of the upper levels, you eern the right to cream e Green Butterfly and earn 200 points per floor. And finally, there is the Mask of Death, worth 300 points per drop.

Apple *Panic* requires the color/grapb-ics board, but would be readily pleyeble on e monochrome screen. It was tested on an RGB color monitor, and the animation and colors are very impressive. Response to commands is quick, despite the fect that something is elweys moving in one direction or enother on the screen. You move the pleyer by striking an A for up and e Z for down, e left epostropbe for left and a right epostrophe for right. The spece bar controls the bemmer. There is no command to suspend the game in mid-pley and no record on the disk of high scores.



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List Price: $12

CIRCLE 696 ON READER SERVICE CARD

Have your fingers recovared their spring after typing in tha Koleidoscope program listing that appear In *PC* Mogozine last issue?

Honestly, there was no secret plan involvad, but just as that adition was going to press, a commarcial program called *Kaleida* came in the mail for review. No squinting to read a program listing, no hours of typing, no deciphering of BASIC error codas. This one should work whan you taka it out of tha box, and it is very reasonably priced.

Kaleido actually offers evan more than the moving picture that wa published last month. It allows you to select ona of ten pallattas and one of three different cantral star patterns in ona of four colors. You can vary the speed of the davaloping kaleidoscope, freeze the action, and shrink or anlarge the image.

The program includes a nifty set o screen color charts of tha keyboard mands, a check of display colors as as information on warranty, and a response form which can be printed o the owner. The licensa for Koleido (w is not copy-protected) allows you to copies for a friend, asking only tha friend mail in a $4 registration fee t developar. Tha fee entitles the secon ownar to tha sama lifetima guar against bugs offared to original pur ers.

All this said, the Koleido progra really nothing more than a pretty m picture on your screen. But tha peop "Once Bagun Computations" have up with one extra littla dividend to j laaving Kaleido on your screen all da hitting the . key, tha screen displays ning clock, taking its information tha DOS sign-on time. So, this pro lets you turn your PC lnto a pretty, ing wall clock. What will they thi next?

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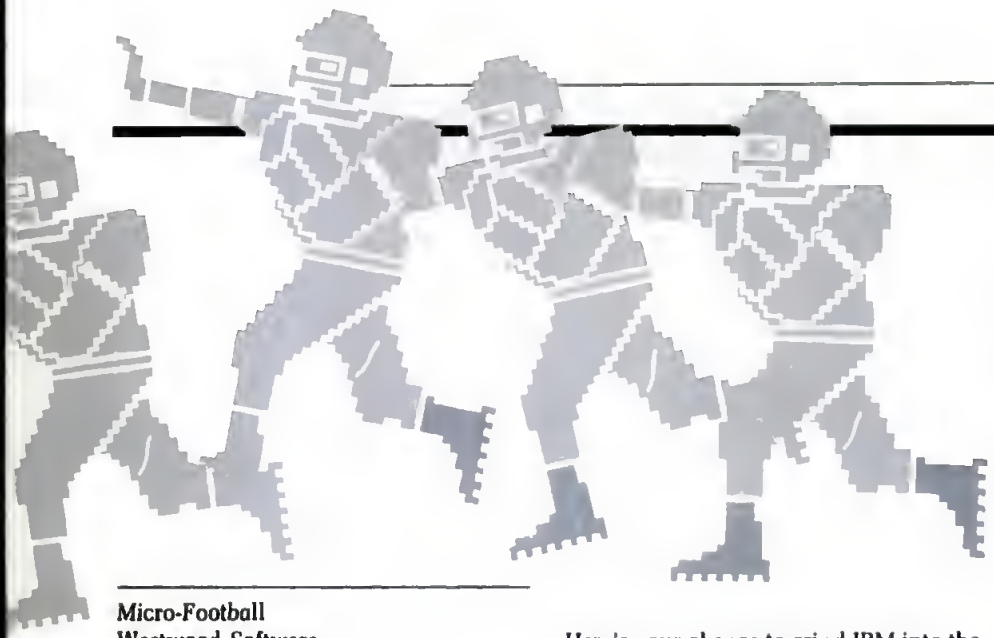

Micro-Football
Westwood Software
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Here's your chence to grind IBM into the mud, sport fans.

Micro-Football hands you the reins of e professional football team, pitted against "IBM" on a 6-inch green, blue, or black playing field. You are offered eight different types of running plays: dive, off-tackle, scissors, trep, sweep, option, reverse, or drew. There ere six variations of the passing play: sideline, look-in, roll-out, screen, fly, and post. And finally can call for a field goal, e punt or a sr quick kick on offense.

When it comes your turn to pley " FENSE" the alignments are: the 4-3 ' set-up, the 5-2 "nickel," e short-ya line and a "prevent" defense.

The choices mey be edequate to a for a bit of thought from time to time

THE PROGRAM seems much more oriented to random chance than to defens or offensive strateg

the fact is that the algorithm of th gram seems much more oriented t dom chance then to defensive or sive strategy.

TSO/SPF for your IBM * PC?

you will never come closer than with the

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We offer a comprehensive system with all the integrated functions you have learned to depend on. **PLUS** the dazzling performance and instantaneous response time you have always wanted.

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- A Full-Screen Editor Similar To SPF
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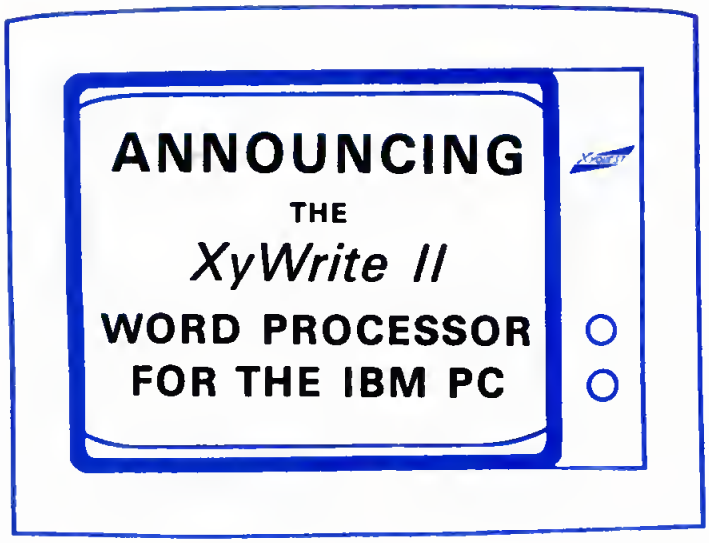

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CIRCLE 501 ON READER SERVICE CARD

The onscreen display, too, is rather disappointing. You are presented with a line drawing of a football field as it might be seen from the Goodyear blimp, with the field goal posts angled outward. You are a little O, and the ball, when it moves, is a moving solid line. There is no depiction of players on the screen, and the ball moves as a single solid line up and down the length of the field, never varying from the center hash mark even if you've cleverly called for a sideline pass or a sweeping run. The sound effects are almost sharp enough to cause a wire-haired terrier some pain, but there was no attempt to put in a hint of crowd noise—a relatively simple bit of white noise would have done that trick.

Figure 1: Example of halftime statistical summary from Micro-Football.

HALFTIME STATISTICS	PC DISK DRIVERS	IBM
POINTS	14	Ø
FIRST DOWNS	5	2
RUSHES-#/YDS	9- 62	1Ø- 24
PASSING YDS	9Ø	11
RETURN YDS	38	41
PASSES-CP/AT/INT	5- 6- 1	2- 4- Ø
PUNTS-#/AVG YD	Ø- Ø	2- 42
FUMBLES-#/LOST	1- Ø	1- 1
PENALTIES-#/YDS	1- 5	1- 15
NO. OF PLAYS	16	16

One nice feature of the game is a halftime and final statistical summary (see Figure 1).

IBM went into even more of a defensive posture in the second half, holding the PC Disk Drivers to about 20 yards and no points. The final score, though, was a triumph for the independents, a 14-7 PC win.

With the exception of the statistics, though, what Westwood Software has done is essentially transfer the back-and-forth, unspectacular action and beeps and boops of a handheld electronic football game to the powerful microcomputer. We deserve a bit more, considering the price of a ticket on the IBM PC 50-yard line.

The Chrome Ranger
Omniware
8972 East Hampden Ave., Box 32
Denver, CO 80231
List price: $29.95
Requires: 64K RAM, PC-DOS, monochrome display and card or color/graphics card and monitor or television. Game adapter and joysticks are optional.

CIRCLE 697 ON READER SERVICE CARD

You could call this one "Poc-Mon Punches In."

The Chrome Ranger is a quite competent evocation of the successful arcade game, with a very important addi
You can play it on a standard plain-v
le office-configured IBM PC. Yes, w
the boss is out of sight, you can play
Chrome Ranger on a PC with 64K of R
e monochrome monitor and the cu
keys. The sound can be turned off,
From the other side of the desk you
look as if you were hard at work punc
in a very long and repetitive set of n
bers on the keyboard's number pad.

The program also supports a full c
display driven by the color/grap

THE SOUND effects are almost sha enough to cause a wi haired terrier some pain.

board. A joystick can be used with a
the color or monochrome version if
computer includes a game adapter b
es well.

If there is anyone out there who
not know the all-too-familiar Poc-
(and clones) scenario, it is this: The
trol figure is an electronic bomunc
whose sole purpose in life is to eat c
eaten. He (or she, in the arcade "Ms.

We have developed an 8" diskette system called "THE FILE CONNECTION" that can be used to exchange source, data, and word processing files between the IBM PC and hundreds of other computer systems. We use a modified IBM diskette controller card to attach either 1 or 2 external 8" drives to the IBM PC. Our utilities work with all IBM models including the 3741, 5120, S/1, S/34, S/38, S/370, 43XX, and Displaywriter. Other systems include DEC, NCR, TRS80, Univac, Burroughs, Honeywell, and CP/M.

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The complete system price including TANDON 848-2, enclosure, cable, and basic utility programs is $1295 for one drive and $1995 for two drives. For users who want to use their own drives, the basic utility programs and documentation are available for $695. Payment is by check or COD with delivery within 10 days.

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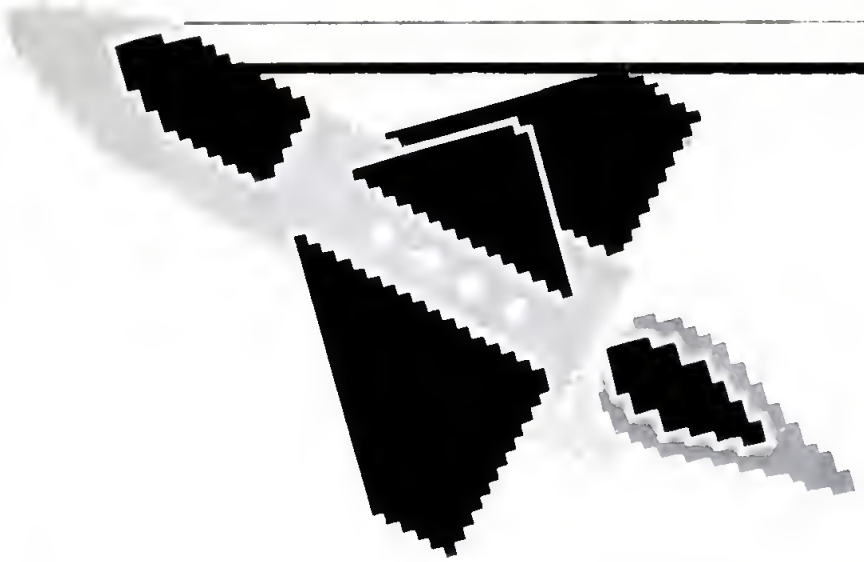
CIRCLE 293 ON READER SERVICE CARD



the technical specifications of the n
chrome display card, the reaction
ranger to joystick or keyboard comn

THE CENTRAL
figure is an electron
homunculus whose s
purpose in life is to e
or be eaten.

Man" version) chases around a maze gobbling up dots of one sort or another, pursued all the time by voracious enemies. In each of the corners of the maze are "energy dots" or "magic pills" or somesuch special potion. If the hero eats the dot, all of a sudden he is endowed with a brief burst of bravado, and can turn around and devour the nearest attacker.

THE PROGRAM IS self-calibrating for joysticks.

And, so The Chrome Ranger: On the color monitor, the game is attractively drawn, with a white muncher and multicolored pursuers. The ranger himself emits a cute chomping sound as he gallivants around the maze. The on-screen maze is relatively full, and the more advanced mazes include dead ends, which make for some mad in-and-out dashes.

But it is really the monochrome screen version that is the star of this product. The maze and players are drawn with ASCII characters with great care. And because of

is noticeably quicker than with the
graphics card version. The only dra
would seem to be that there is no w
tell whether the ranger is invulne
On the color screen, all of the chase
their hue for a few seconds.

If both display cards are mount
the PC, the program asks you to sele
or or monochrome. Other choices in
three levels of difficulty, choice o
stick or keyboard control (the arrow
or the A-Z and J-K letters for up or
and left or right), and the toggle on
for sound. The sound, by the way, i
sufficient to add some interest and n
raucous es to interfere. The progra
self-calibrating for joysticks.

All in all, The Chrome Ranger is a
thy game to be played while waitin
Tonto.

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THE CASE OF THE MISSING WINGTIP WIDGET

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olved...with the simple genius of the RL-1 Relational Database.

night clerk's digital watch wed 2:35 a.m. when the desk phone interrupted his ntory updates at the IBM PC. as a double ring. An outside . Williams sensed trouble as unched line 3.

"Worldwide Widgets, liams here."

"Walla Walla Widget Works," he the reply. "One of our gets went."

"What type?"

"Wingtip."

Williams winced. Worldle hadn't made a wingtip get since way back when.

"We wouldn't have a wingtip get at Worldwide, Sir. They're olete."

"If we don't get one by dnesday," the voice wailed, 're wiped out."

There was one chance. The 1 Database Management tem. If he could track down last time a Washington dealer ordered a wingtip widget...

Williams was no programr, but that didn't matter. ning to the computer, he put question to RL-1 in simple lish:

```
elect DEALER, QUANTITY, DATE
om INVOICES
here PART EQ "WINGTIP WIDGET"
nd STATE EQ "WASHINGTON"
```

Within seconds, Williams his answer. A dozen wingtips nt to Wally's Widgets 6 years . But would Wally have any ?

Yes! Waking Wally was well rth it. The last wingtip widget in Wally's warehouse was on its way to Walla Walla.

Who? What? Where? When? Why? RL-1 knows.

Give your micro the power of RL-1, and you'll be able to handle data like a master detective. Without mastering BASIC or COBOL or FORTRAN or any other mysterious language.

Once the RL-1 floppy disappears into your disk drive, you're armed with a complete relational database management system. And that means life at the computer is going to be a lot simpler from now on.

Independent minded.

The secret of RL-1's genius is *data independence*. Instead of locking data into programs, you create *independent* databases. So different programs can use the *same* data. And you can get at day-to-day information without expensive reprogramming. Or wading through reams of redundant data.

Case in point: standard programming packages. Like accounting, for instance, or inventory control. Most are fine for what they're programmed to do. Beyond that, even the simplest questions can leave them without a clue. Whether it's searching through invoices for missing widgets. Or looking for customers with too much debt. Or finding the address of your aunt in Vermont. Conventional programs just aren't smart enough.

Enter RL-1. So easy, the butler could do it.

It's a different case with RL-1. You'll DEFINE exactly how you want your information stored. Dollar signs that "float." Dates that look like "July 17, 1983," not "071783." Numbers that are decimal, integer, or real.

Then you'll input data easily with a full-screen editor. Or LOAD in batch directly from ASCII files.

Now use RL-1's Query Language. Ask your questions in English. Get your answers in seconds. Include high-level math —even statistics—in your line of questioning. (Programmers can tap RL-1's genius through its Program Interface.)

As your data changes, you can UPDATE and DELETE whole files with a single command. Or edit item by item with the Relational Editor.

A motive to get cracking.

The sooner you get started with RL-1, the sooner you'll be cracking your own tough cases. So here's a little "nudge." Order RL-1 from your dealer or ABW by June 30, 1983. And you'll receive a coupon good for a free Report Generator Application Pack. $75 worth of extra genius that'll make short work of your lengthiest reports.

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CIRCLE 127 ON READER SERVICE CARD

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the Buffer tha

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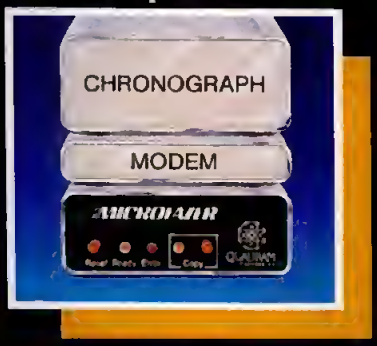

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CIRCLE 382 ON READER SERVICE CARD

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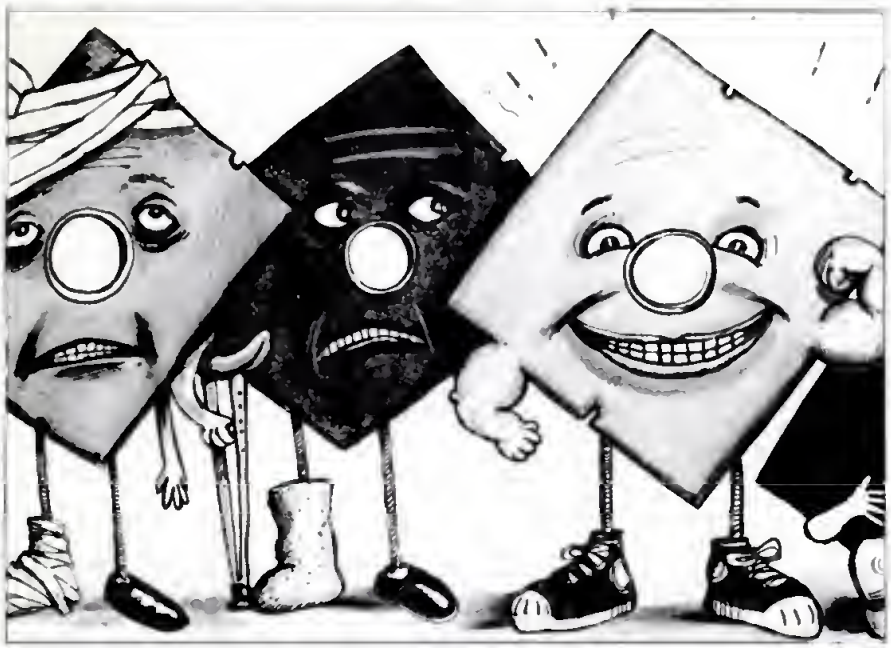
The Select Approach



Select
Select Information Systems, Inc.
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(415) 459-4003
List Price: $495

CIRCLE 691 ON READER SERVICE CARD

Select is a full-faatured word procassor/spelling checker/meil merge program eimed squarely at the business end professionel market. According to Creig Rudingar, Vica Presidant of Markating for Select Informetion Systems (SIS), the firm is "virtually 100 percent committed to the business envlronment, ranging from the individuel who has been trained to operete a dadicated machine and is now convarting to e microcomputer, to lawyars, writers, and other professionels.

"Thet's the environment we really relate to. Although we feel everyone cen banafit from Select, the product is not aimad at tha casual usar who wants to send an occasional letter to Aunt Millie." SIS counts among its customars Ford Motor Company, Citibank, Hughes Aircraft, end othar major firms.

By and large, the Select program and documentation confirm Rudingar's obsarvetions. There is often e trede-off between the power and features any program offers end the ease with which you can mester end begin using it. Select strikas a good balance. A thoughtful design, a sound fundamental approach, end en onscreen instruction module called Teech meke the progrem's besic feetures excaptionally easy to mastar.

The Teach module and program documantation are considerably less suc ful, however, in showing you how t the progrem's more complex fee And, while you can begin creating printing text in under two hours, th reason to doubt that you'll be ab "teech yourself word processing minutes or less" as the firm's promot literature claims. Select also has a ber of limitations thet mey or may n important, dapending upon your sp needs.

Nevertheless, when you conside market tha product is designed to se secretaries with no previous exposu computers, word processor oper end busy professionels with neithe time nor the desire to master a co program, regardless of its power—S appaars to be right on target.

A Departure from WordStar

One of the most important thin undarstand about Select is how the gram's overall approach differs fr product like WordStor. In WordSto example, once you bave begun to wo a document, you are always in might be called the "text creation" n Whenever you want to set margins, a the text, set e block marker, or do virt anything else, you must leave this by striking the Control key, plus e let go to one of several onscreen menus. menus are displayed only when the est "help" setting is used.) Next, you enter your other commands or spec tions. The program takas care of bus and than drops you back into taxt cre mode.

Select approaches word processi a different wey. With Select, yo elways in "salect" mode. If you wa

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CIRCLE 456 ON READER SERVICE CARD

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CIRCLE 286 ON READER SERVICE CARD

eta text, you move the cursor to your gat point, hit the I key for "insert," end oe text. When you are finished, you ess the Escape key to leave "insert" end urn to "select." From there you can posa the F key for "format," the P key to "pointers" (block markars), tha S key "spell," and so forth.

This overall approach is important for least two reasons. First, it saves keyokes. In WordStor, you must strika tha ntrol key and the appropriata letter key get to a particular menu, then strike othar key to maka a selection from that nu, and finally type in your specifications for that selection. With Select, you e single letter and respond to the ulting prompt by typing in your specs. r axampla, to tell your PC to find a parular word in your Select text, you hit e L key for "locata," respond to the ompt by typing tha target word, and hit e Enter key. The cursor immediately es to the word and the system drops u back into "salact" mode.

Second, these simple lettar commands e inherently easier to remember than n-mnemonic combinations like "conl key-menu letter-menu selection." Of ursa, much depands on what you come accustomed to. Some people are solute whizzes at WordStor and uldn't dream of using anything alse. d in trutb, WordStor is the more pow-

WHEN YOU onsider the market the product is designed to erve, Select appears to be right on target.

ul program. But because of its basic proach and simple letter commands, lect is much easiar to master.

sing Select

There is no substitute for e hands-on, t-it-through-its-paces demonstration of word processing program, particularly you're a writer or professional who hes use it every day.

There's more than a little truth to tha quantly published stories of some author's attachment to the Royal, Olivattl, or Underwood typewriter he or she has spent so much time communing with in the past. Tha typewritar, however primitive, becomes e trusted, santimantal friend. Word processing programs are no different.

If you're thinking of purchasing the program for en office, the same general rule applies: If at ell possibla, lat the people who are actually going to use it try it out before you make your decision.

In the past, SIS has offered demo disks for use on Apple, Altos, and other computers for about $10. Select recommends thet IBM PC end users who want to view e damo should first contect their local dealer, or get in touch with Select directly if their dealers cannot provide one.

Creating and Formatting

After booting the program, your first step is to open a file for the document you want to creata. You hit the C key and respond to tha prompt, "CREATE: Enter documant name, than <RET>." Hit the Return key, and you'll get a "blank page" (See Figure 1).

Pressing the N key for "Next" yields the menu choices: "Spell, Format, Background, Append, Viaw, Xchng, Tab, Key, Help, Next." Hitting tha N key again causes the third and final menu line to appear: "Move, Copy, Zap, Output, Write, Justify, Naxt."

These are the main Select tools. Generally, pressing any letter will cause some type of prompt to eppaar at the top of the screen. One major exception is the F key for "Format." Pressing this latter causes an entire screen to appaar. The screen contains some 14 different formats.

You can use this screen to change margins (left, right, top, end bottom), paper length, and othar settings by striking a single key. Significantly, this approach allows you to set all your format specifications at the same time, without entering a separate command to produce a prompt for each one.

When everything is as you want it, you press tha Escape key to return to the text. And there you will find eny non-default formet specifications noted to the far left of the text. A left margin setting of 15, for example, appeers es \L15<.

Figure 1: Select command line menu

```
>SELECT: Insart Erasa Printer Goto Locate Replace Display Quit
Naxt
Documant: (driva:filanama)    Char: 1  Line: 1  Page: 1

-------L ------------------------------------ R-------
```

Format settings mey elso be typed directly into the text using the same "reverse slant-lattar-number" format. This can be usaful for changing margins within the text as you are creating it.

REGARDLESS of how they are entered, the format settings become a part of the document.

Unlike WordStor end many dadicated word processors, Select allows double and triple spacing. However, it displays only singla spacing on the screen. The program elso features taxt adjustment, which automatically eccommodetes insertions and deletions.

Regardless of bow they are entered, the format sattings become a part of the documant. You may also entar headers, footers, automatic pagination, and nonprinting comment linas. Pages are numbered consecutively, starting at whatever number you specify.

Text Manipulation

When you are in "Salect" mode, directional arrow keys on the PC numeric kaypad move the cursor anywhere on the page. You can move one space or one line et a tima, or type in a number and hit the dasired arrow to move that number of spaces or lines.

One particulerly useful feeture is the period key. When in "Select" mode, hitting the pariod immadiately sends the cursor to tbe next period on tha page.

To leep long peges at e single bound, you hit the G kay for "go to," end respond to the prompt for "Top," "Bottom," or "Pege" (number) of the documant.

Figure 2: The Teach menu.

```
                    THE TEACH MENU
 ------------------------------------------------
DIRECTIONS:  1. Read the menu choices listed below.
             2. Type number of section you want, than press
                RETURN.
              - To leave TEACH press RETURN.
 ------------------------------------------------
Your entry: * * (To start at the beginning, type 1).


 1. How TEACH WORKS                  15. How to FORMAT
 2. How to MOVE THE CURSOR           16. How to DISPLAY
 3. How to CREATE a documant         17. How to VIEW
 4. How to READ THE COMMAND LINE     18. How to set POINTERS
 5. How to BEGIN A NEW DOCUMENT      19. How to MOVE
 6. How to EDIT a document           20. How to COPY
 7. How to INSERT                    21. How to ZAP
 8. How to ERASE                     22. How to OUTPUT
 9. How to XCHNG                     23. How to WRITE
10. How to LOCATE                    24. How to JUSTIFY
11. How to REPLACE                   25. How to use KEY
12. How to GOTO                      26. How to get HELP
13. How to APPEND                    27. How to QUIT
14. How to sat TABs
```

You can menipulate text in thr mejor weys. First, you can set a pointer the beginning and end of e block of text moving the cursor to those points, pre ing the P key, and entering the numb you wish to use. Once a block has be marked, you can "Move" or "Copy" it another locetion on the page, "Zap" (d lete) it, "Output" (print) it, or "Write" to a new file on disk.

You can also bring files in from yo disk and append them to the text you a currently creating, and request an inst directory of your disk(s) to locate the c rect neme of the file you're looking fo

The directory includes a line telli you how much space is left on the disk you're not sure what's in the file, you c "View" its contents before inserting it

Finally, you can load files into any all of the ten function keys (F1-F10). Th is useful for quickly inserting frequen usad phrases, boilerplate paragraphs, e the like.

Actually, the number of programm ble keys is almost unlimited. If ten ke aren't enough, you cen use the numb keys et the top of the keyboard to des nate key files from 11 on. You can ge listing of key file names and view the cc tents of any of them et any time using t

Type T for Teach

There's no other word for it. The Teoch feature included as part of the Select Word Processing System package is simply super. By its own edmission, it wiii not show you how to usa all of tha Select capabilities. But it offers an excellent introduction to most of them end it takas full advantage of tha ability of the computer to drill you on what you've learned.

After talling you how to install Select for your printer, the manual boldly states, "The best way to laarn Select is to Put Tha Manual Down Now!" You are than advisad to insert the Teach disk that comes with the package.

With the master disk in Drive A and the Taach disk in Driva B, you simply type T for "Teach" (see Figure 2.). After providing an explanetion of Teech end what to axpect when using the module, selection 1 moves you to selection 2. You are then taken through evary stap in a process designed to last about 90 minutes. You mey elso stert with any of tha 27 selections.

In each casa, Teach defines e command ("What it does:") end gives you step-by-step instructions for executing it. it then givas you an opportunity to try without tha instructions. Whan you're finished, the progrem tells you if you were right or wrong and gives you the option of going back for another try, moving on to the next subject, or returning to the Teacb manu.

For your emusement and encouragement, the program provides numerous comments in e kind of mellow California style—commisereting with you when you fail, as if to say, "Hey, it's okay. Just go with the flow. Let's give it enother shot," end praising you when you do well. At evary juncture, you are flattered, teesed, or otherwise urged to stay with the program. If you have an ounca of curiosity in your brain, you'll find it difficult resist tha urga to look at just one mo Salect command.

Pert of the appeal of Teech, of cour is directly relatad to tha fact that the fu damental features of Select are inharen eesy to learn. As you progress through t Taach manu, you feel your mastery gro ing. ("Okay, I know how to do th What's naxt?")

But there's also the fact that alm from the momant you opan the Sel package, you are actuelly using your F Is there a PC ownar anywhere who c resist laying the manuel eside and bo ing e new program es soon es it's out the package?

Even with glaring lapsas in tha man al, most sacretaries or other professiona who heve a basic familiarity with tha should be able to mastar the major fe tures of Select quickly and easily by usi Teach. —A

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key command.

The only drawback is that key files are not easy to create. You have to take time to create a single document with all nf your key file information on it. You must type the Information exactly as you want It to appear, and decide before you begin which function key is to be loaded with which text block.

In addition, you are limited to one key file per program disk. Obviously you can get around this by renaming various key files whenever you want to use them. But one way or another, using the function keys requires considerahle preparation.

Editing and Printing

Editing text is fairly easy. The "Replace" command prompts you for the old word and the new word. When executing, the cursor will stnp at each occurrence and you'll be given a "Replace? Y/N" option. The old wnrd must be entered exactly as it appears in the text, however, and there is no "wild card" feature.

The "Erase" function allows you to move the cursor over the words you want to delete. But should you make an error, you may backspace to restore the mistakenly erased character, word, or sentence. Nothing is removed from the text until you hit the Escape key.

One especially convenient featu the provision for removing "hard car returns." These are the returns you from the keyboard to end a paragrap preserve a blank line. In other word cessing programs, they can be very c

USING THE function keys require considerable preparation.

cult to nullify. Select allows you to place" them with a null character.

Printing a document is also relati easy. Choosing the P option from Select welcome menu takes you screen that lets you enter the start p end page, number of copies desired, the like. You make your choices, hit Escape key, and follow the prompt activate the printer. Select also supp "Background" printing, an important ture that allows you to print one d ment while editing another.

A very important caveat: Select is posed to support bold, underline, and superscript printing. However, o all these, my Epson MX-80 printer Graftrax, produced only bold prin and underlining. The manufacturer unaware of this problem but promise look into it. Clearly it is something should check before buying the gram.

The program does not support o more exotic printing features suc strikeout and expanded or compre printing. And there is no indication t patch script of the sort used by Word can be created.

Superspell and Merge Features

A spelling checker and a mail m program are included as part of the dard Select package. The speller co with a dictionary file containing 9 words, and it is so easy to use that you plunge in without consulting the d mentation.

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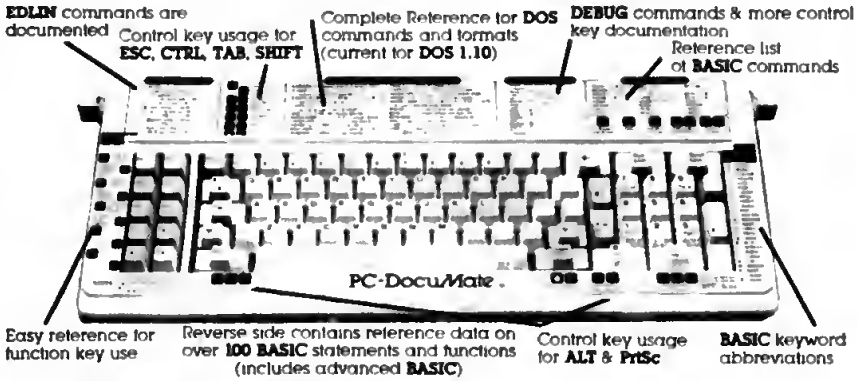

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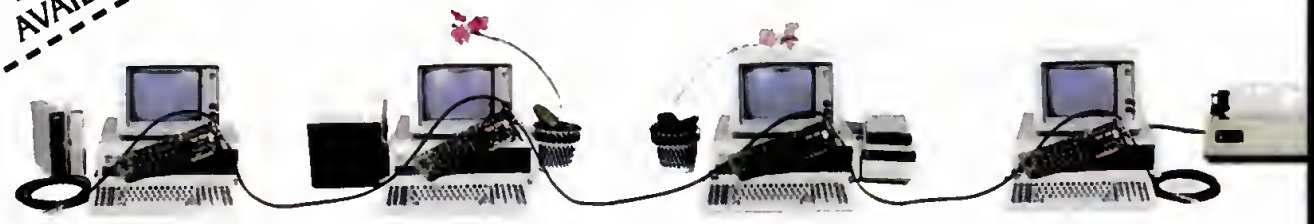

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user applications to be easily converted to multi-

PC SHARING enables one PC to execute comm
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ıry, then asks you whether you want ark eech word in the text, ignore it, or t to the dictionary. When the identi- on process is over, the system takes to the text end eutometically ad- es the cursor to eech marked word orrection.

ou can supposedly creete special onaries and add end delete "dictio- sets" of words from the master dic- ıry. Unfortunetely this is very poorly mented in the manual and not men- d at all on-screen, either in the rspell or the *Teach* modules.

he manuel focuses exclusively on the r torturous—end elmost irrele- —process of removing inedvertently d miaspelled words from a dictio- . (It would be so much simpler to the dictionary file from your master rspell disk onto your work disk.)

othing is seid ebout how to create a dictionary. Repeated ettempts to test feature resulted in the messege "Not rspell format." An SIS customer ser- repreaentative was unable to explain lgnificance of "R—Reorganize a dic- ıry," even though it is a menu selec- in this module. Such sloppiness is aying in any product. But with a uct in this price range, aimed at this et, it is absolutely inexcuseble.

ı light of these deficiencies, it seems st trivial to point out that there is no to access a Superspell dictionary or lictionary module. You must elweys

***THE SPELLER* so easy to use that you can plunge in ithout consulting the documentation.**

Superspell to proof e document

he mail merge program seems to be t standard for microcomputer word essing programs, though here egein, ocumentation of this important busi- feature leaves much to be desired. ly it is worthy of an entire chepter in nanuel, instead of an extended and ısing description in whet is other- wise e glossary of *Select* commands.

It is essentially e barebones program designed to do an adequete job of produc- ing mailing lebels end customized form letters. There seems to be no limit on the number of names and addresses you can have on e meiling list. (At leest no limit is stated.)

But you are limited to eight rigidly defined fields, each of which can contain only e certain number of charecters. The variables and associated field lengths are: name (30), first (30) end second (30) eddress lines, city (24), state (2), zip code (9), phone number (13) and "reference."

The reference varieble is intended to be e nickname, though the field can accommodete up to 127 characters. Thus you can produce e letter eddressed to Mr. Robert Smith which opens "Dear Bob," but you cannot also include e personal- ized comment ("As we discussed on the phone lest Thursdey . . ."). Or you can include the comment and settle for "Dear Robert."

There is no way to sort or select names from your mailing llst for specielized mailings, though you can go through your master list end use the *Select* word pro- cessing features to create specialized lists

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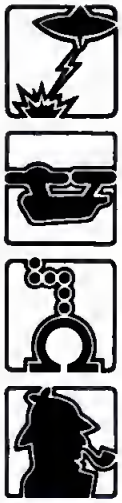

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menuelly.

If you need sort and select features to generete sophisticeted maiiing lists (printed by Zip code, tergeted to qualified prospects or customers meeting certain criterie only, etc.), you should probahly look into e good detebase menegement program that will let you creete letters with Select end merge them with informetion from your files. As eiweys, check before you buy.

The Select menuel is typewritten, but the leyout is crisp end eesy-to-read. And SIS ls to be commended for including en index. Written in e conversetional, informel style, the menuel represents e step in the right direction for computer documentation in general. But in many other weys it is inedequete and incomplete. There seem to be whole chunks of information missing—informetion one expects in e menuei for e $495 word processing package. To say nothing of the fect that, as footers on every page proclaim, this is the fifth edition of the work.

The leck of informetion on the dictionary portion of Superspell, the hephezard treatment of meil merge, and en overeii leck of a coherent presentation tend to outweigh the pleasant tone. It is difficult to avoid feeling thet no one ever reelly sat down with Select end went through it step-hy-step to produce e soiid instruction book. Cleerly no one ever did so for the PC version of the progrem.

THE MANUAL represents a step in the right direction for computer documentation in general.

The only customizetion for the PC is the addition of a pege telling you how to make beckup copies of your disks, e gle sheet et the beginning alerting yo the system requirements and one or minor inepplicahle functions, plu three-word list of CP/M commands their MS-DOS equivalents.

It's not unfair to hold puhlisher word processing program documenta to higher standards than the rest of industry. A prospective user is natu inclined to wonder, "If your prog makes text creation and menipuletio eesy, shouldn't it he e snep for yo produce a manuel customized to mechine?"

Other Considerations

"Printer instelletion," thet is, the cess of customizing your copy of the gram for your particuler printer, hreeze. "Instellation" end why it is ne sary is not expleined in the manuel, the instructions ere easy to follow effective.

Besicelly, Select gives you en In disk with over 25 prepared prog

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petches. You merely choose your perticular hrand of printar when prompted, and the system does the rest.

There is one extremaly importent caveet, howevar, concerning tha type of monitor you use. The review copy of Select would not work on a BMC monochrome monitor plugged into the color/graphics card. SIS is eware of the prohlam and expects to heve e BMC-supporting version reedy in early spring.

Select, according to SiS, was issued for the PC with support for the IBM monochrome display and for the Amdek Color II RGB monitor. If you are considering Select be certain that it will run on your monitor.

Select will display only 80 charecters ecross the screen. (There is no horizontal scroll.) The right margin can ba sat beyond 80 to whetever limit your prlnter will accommodete, hut on the screen, the text will wrep around onto tha naxt line.

There is no provision for hyphenation. Columns of text can be moved from one pert of tha pege to enothar, but there is no special feature to make this easiar.

Select runs fast. With 128K, the minimum requirement, disk access is kept to e minimum. You eccess your disks only to hring in e fila or tha taxt loeded into one of the function keys.

If you heve e memory board capeble of functioning as en electronic disk, you can loed the entire Select progrem or text files into RAM end accass the disks only to save a document.

IF YOU ARE considering Select be certain that it will run on your monitor.

There is also a typing buffer, making it impossihle for you to heat the machine. Everything you type eppears quickly short, the program runs very smooth

Select is a well-designed, easy to le word processing progrem thet—poss because it is so eesy to learn—is also to use. it does not offer all of the featur word processor might offer, hut pros tive purchasers must esk thamselve they will really use all of the whistles bells found in other programs, particu ly lf thay make the program more diffi to mastar.

The manual, unfortunetely, does reflect the sama care that so clearly v into designing the progrem itself. As the manuel presents some aggravat end largely inexcusehle, problems.

In ganeral, however, Select ls a s program, the product of a different v processing philosophy then the th hehind WordStor. It is cartain to fi large market among PC usars. Finall its newly reduced suggested retail p of $495, this word processor/spel checker/meil merge peckage repres an excellent velue.

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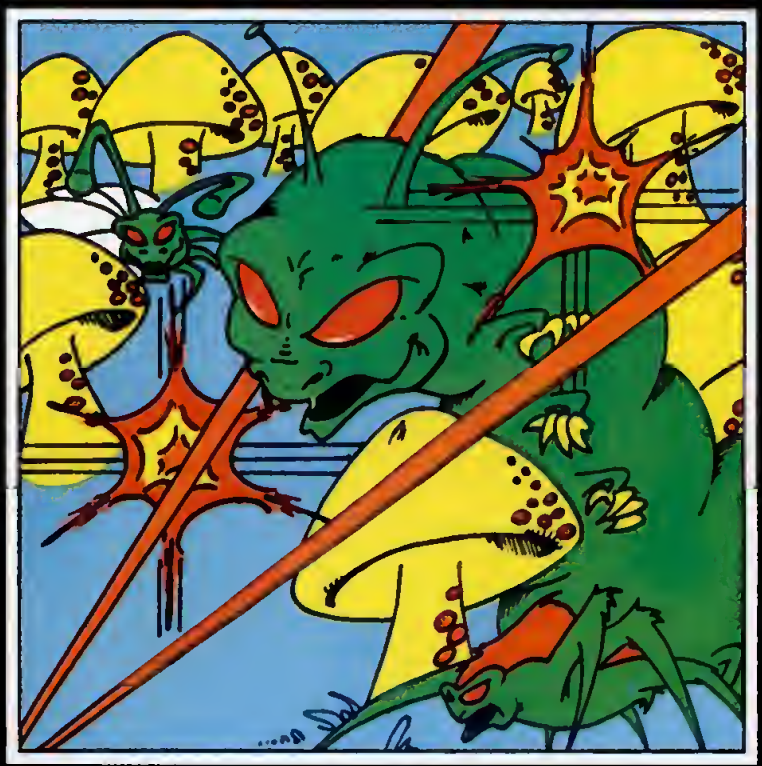

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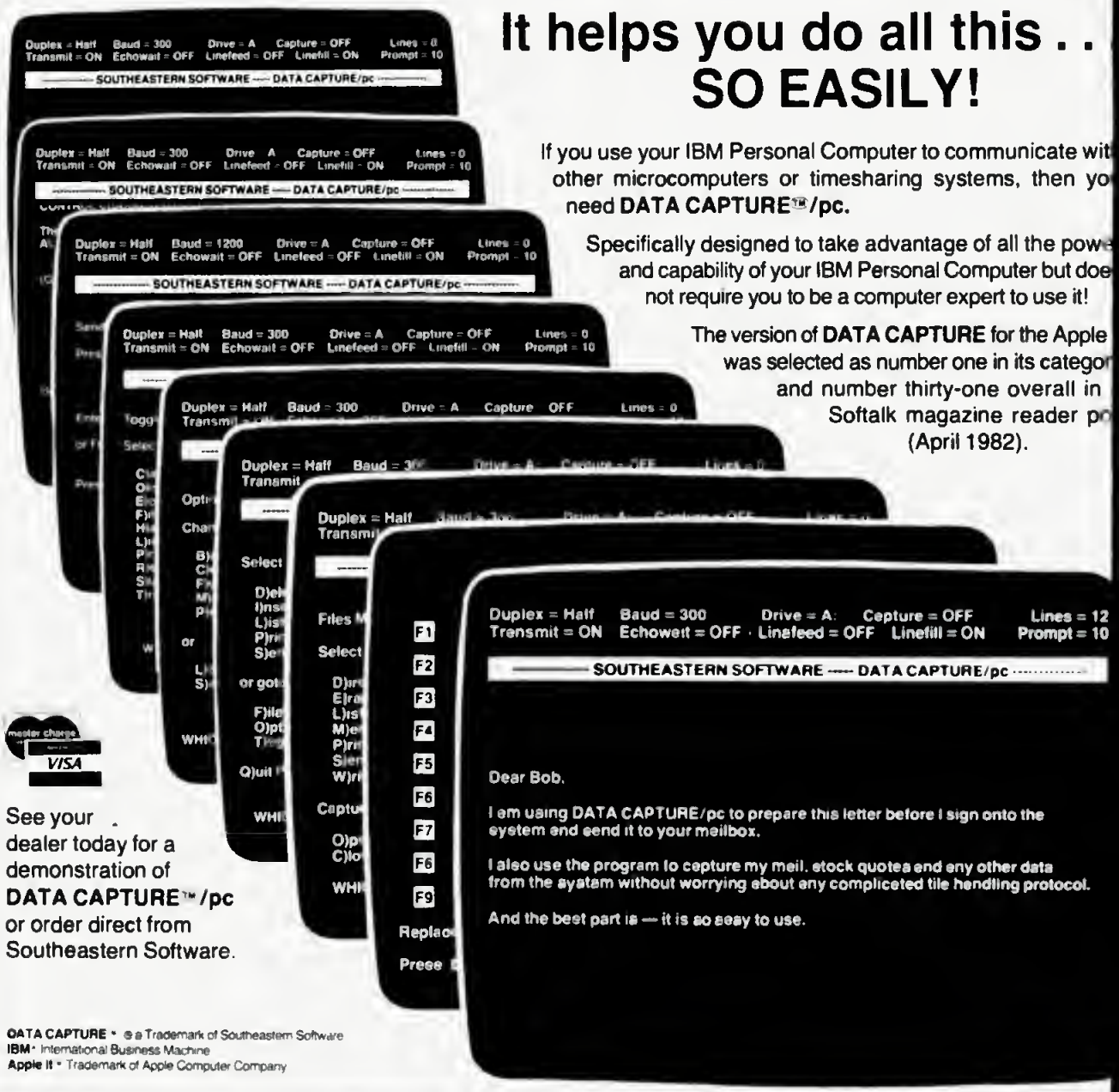

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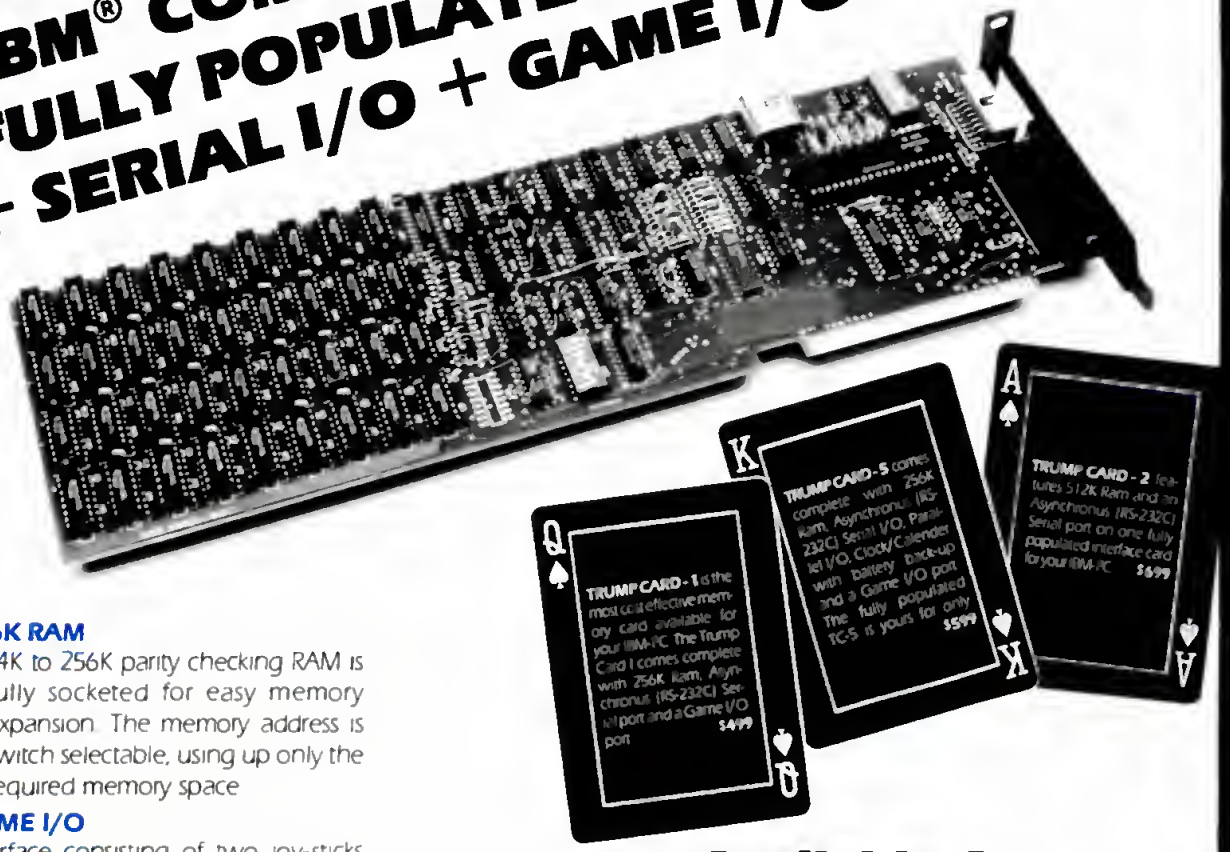

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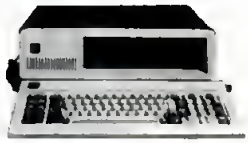

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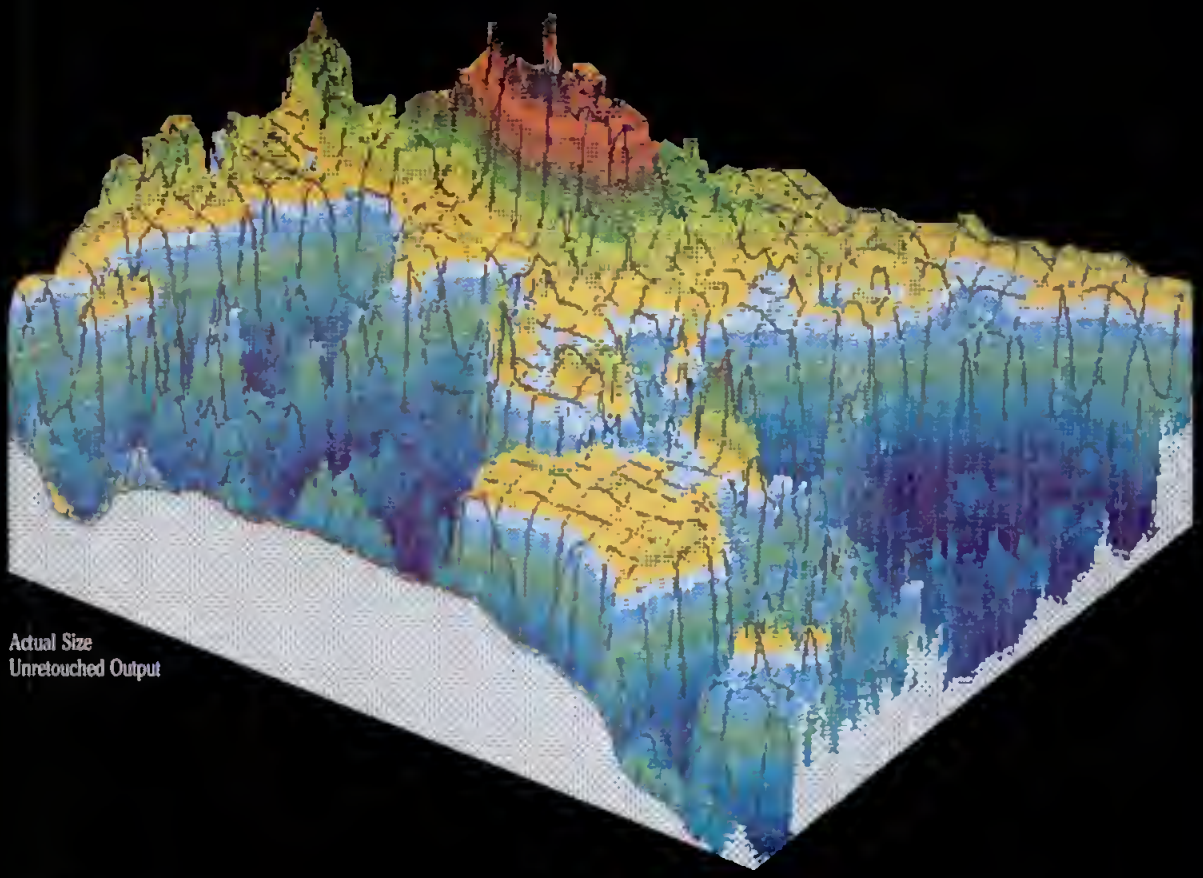

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BUSINESS/PAUL SOMERSON

Le PC has just introduced itself to the French. Despite obstacles that face all immigrants, the future looks rosé.

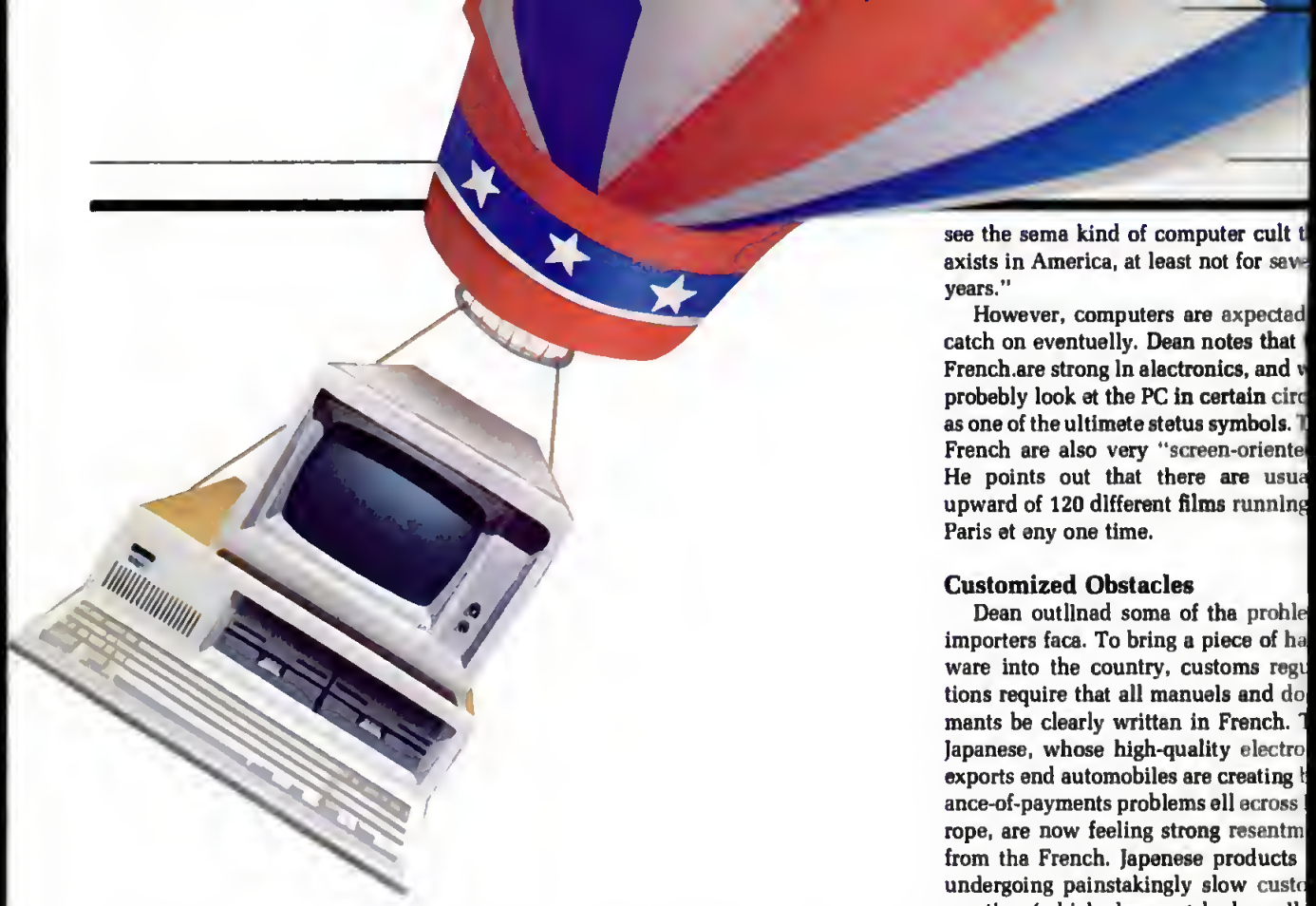
Parlez-Vous P.C.?

On January 19, IBM announced that it was officially introducing the PC into most of Europe, as well as several other points east. An American-born Frenchman named Joel Dean, Jr. couldn't be happier.

Dean offered his views on the computer market from his turn-of-the-century art deco office in Paris, with its gently curving windows, sculptured stone walls, and shimmering mosaic interiors. He is marketing director of Softec, a company created to "translate and transpose" existing software for the PC into versions the French can use. As he puts it, "This is a tremendous opportunity for people who want to ride the IBM wave. The market is fertile, and now is the right time to get into it."

Dean has been introducing new American technologies into France for the past two decades. He brought over the first coin-operated laundries and dry cleaning stores. In fact, IBM's new PC store in Paris's Montparnasse skyscraper overlooks his first self-service laundromat. Later Dean became involved with security devices, distributing equipment that ranged from burglar and fire alarms to sophisticated access control and identification systems.

It was during this venture that Dean initially became acquainted with some of the problems foreign computer companies would face. "The French are intensely nationalistic, and are becoming more so as the world economy worsens. IBM is fortunate in that it has been so well entrenched for so long," Dean explained.



see the sema kind of computer cult t
axists in America, at least not for sav
years."

However, computers are expectad
catch on eventuelly. Dean notes that
French.are strong ln alectronics, and
probebly look et the PC in certain circ
as one of the ultimete stetus symbols.
French are also very "screen-oriente
He points out that there are usua
upward of 120 dlfferent films runnlng
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out thet even whan ha was importing
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plied with French reguletions.

Last yaar whan the PC first began m
ing heedlines in the Unitad States, D
becama interestad in bringing PC-c
petihle software into Frence. "IBM ha

Big Bleu in France

IBM has been in France for quite some time, selling office equipment end its larger computers. According to Dean, "IBM is e magic word in Frence. There is no company there that is battar known or respected. In fact, many Frenchmen beliava 'La Companie IBM,' as it's called, is actually a French firm."

The microcomputar industry in Frence, however, is reletively naw. Commodore mede the earliest inroeds, end was successful enough that Appla end Tendy soon followed, along with Victor and several others. But thay soon found that the oversees merket wes far different from tha domestic merket. European netionelism and problems posed by customs regulations, language barriers, and additional expenses can affect the success of non-Europeen products.

IBM will be selling the PC in Paris et ebout the same price it cherges here, which puts it out of reach of tha avarage citizan. "In France," Deen explains, "there is a group of relativaly wealthy professionals and executives who may be attracted to it." But while there are millions of moderately well-off Americans with enough disposahle income to efford e PC, the same is not trua in France.

"This meens there will be relatively few initial purchasers, and most of these will be doctors, lawyars, executivas, end company owners wbo will buy PCs not for spacific applications, but as curiosities, to ieern what eii the fuss is ebout. Most of the prospective customers were astonished whan Tima megazine made the computer 'Mechine of the Year.' And micros mada a big hit at tha Fall 1982 SICOB, the ennuel office products show in Paris.

"But while tha French won't purchese PCs initlally for their businesses, it's only e metter of time hefore they begin to grasp the financial and organizational powar of micros and begin to usa tham et the office," Dean predicts.

Interestingly, he suspects thet French children will immediately see tha potential of PCs, and will learn to oparate tham better than their parents. In France, the laval of methematics instruction is very high—probahly higher than in America, according to Dean—and even young children should hava faw troubles with soma of the thornier operating principles.

Still, it will be a long tima before tha average *lycée* hes its own PC. The French educationel system is very traditional, and technological edvances are not viawad with the anthusiasm that is common here. Dean predicts thet "you won't

THE FRENCH children will immediately see the potential of PCs.

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gram. Wilson, a native-born Chilean, l
also falt thet there would soon be e n
for e PC-based word processor in a l
guege other than Englisb.

The first product Dean has announ
ls Wilson's new multilingual version
Volkswriter, wbicb will handle text
French, English, Itelian, Spanisb, a
Germen. It will heve menus in each l

MANY Frenchmen believe 'L Companie IBM,' as it called, is actually a French firm.

guage, end will operate on the keyboa
used in the different countries.

The keyboards in each country di
slightly, expleined Dean. The French
sion bas four or five keys in different l
tions than American hardware, as wel
six special language keys. Each cou
has its own accents and punctue
marks, wbich cause headaches for
software designer.

The naw version of Volkswriter
sell for the equivalent of $225, gi
Dean's retailers what be hopes will
Instent end thorough market penetrat
The cost of doing business in Europ
much bigher than in the United St
and, while the French will slowly
producing their own software, Dean f
they won't be eble to match Volkswri
ebilities end proven eese of use—o
reletively low price.

PC Software in Europe

Softec is also negotiating with a m
software manufecturer in the Un
Stetes to produce e full European lin
Integrated taxt processors, mailing
grems, end spreedsheets. It is not p
ning to introduce accounting softwar
European eccounting systems are
stantially different from those in the U
ed States. Accounting practices even
from one European country to anot
Dean speculates thet the first progr
the French create themselvas may be

unting.
)ne of Dean's immadiata goals is to te a 50,000-word machina-readabla ıch spelling dictionary to accompany ext processors. Ha would like to find)lid English/French/English transla- package, but thinks a workable ona is ng way off. He is also eagar to intro- e gamas to French PC owners. Whila da screen-games are only slowly)ming popular, Amarican pinball has ; been a stapla of French café society. l games require only minimum trans-)n—often only the French equivalent Hit Enter key to begin." For obvious ons, text adventure games are further 'n on his list.

)ean is currently looking for Ameri- IBM PC software companies—espe- ly small and middle-sized firms (the ıstry giants have their own distribu- networks)—seeking outlets for their lucts in French-speaking countries could perform the necessary transla- s thamselves.

Softac plans to distribute relativaly titles and spend a considerable unt of effort to earn each one a high ket share. It will provide extensiva ertising and a comprehensive custom- upport program complate with hot- s and American-trained servica per- nal.

)ean is also in the market for certain lware itams. "Tha French like to buy ssories," he says. But he's not inter-

IBM IS A ıagic word in France.

d in dust covers or furniture, "just s that will encourage them to pur- e more softwara." IBM has outlats in ıally every important city and town of size in France. Softec will cover tha e territory, and sell in Luxembourg, ium, and the Franch-speaking areas witzerland and Africa.

ples and Crème

"We're the only startup organization rance for the PC at present," Dean , "although I predict there will soon flood of competitors. International marketing is not as hard as people think it ls, and there are a great many opportunitias right now."

"Apple, and to a lessar degrae, Commodore, have dramatically illustratad that thare is a thriving market for translated software. And similar oparations are alraady starting in the naighboring European countries. Tha PC will be tha cream of the market for years to come, and because of its entrenched position in French culture and sociaty, IBM will almost cartainly succeed," Dean observas.

"We at Softac are eager to follow IBM's successas with our own, and would be delighted to haar from Amarican software producers with programs thay think the French would lika." Daan has reason to feel confident. Not only is IBM almost univarsally respactad in Franca, but it happened to choosa as its PC tradamark an Amarican symbol the French find most appealing: Charlia Chaplin's littla tramp. */PC*

For more informotion, contoct *Joel Dean, Jr., Softec, 2 Rue Poul Sounière, 75016* Poris, Frunce; Phone: *33-1-504 3030*, Telex: *620000*.

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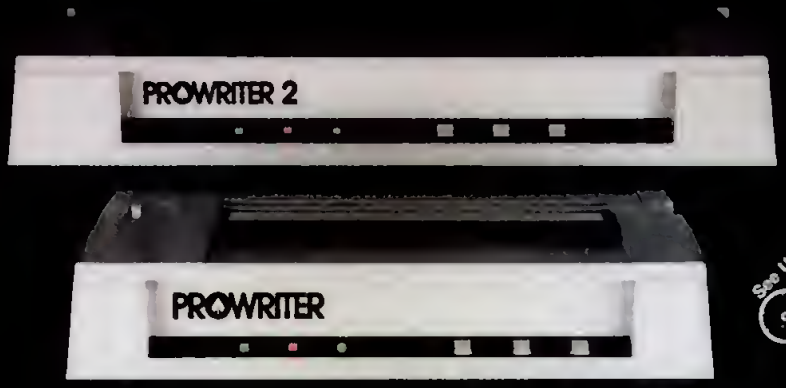

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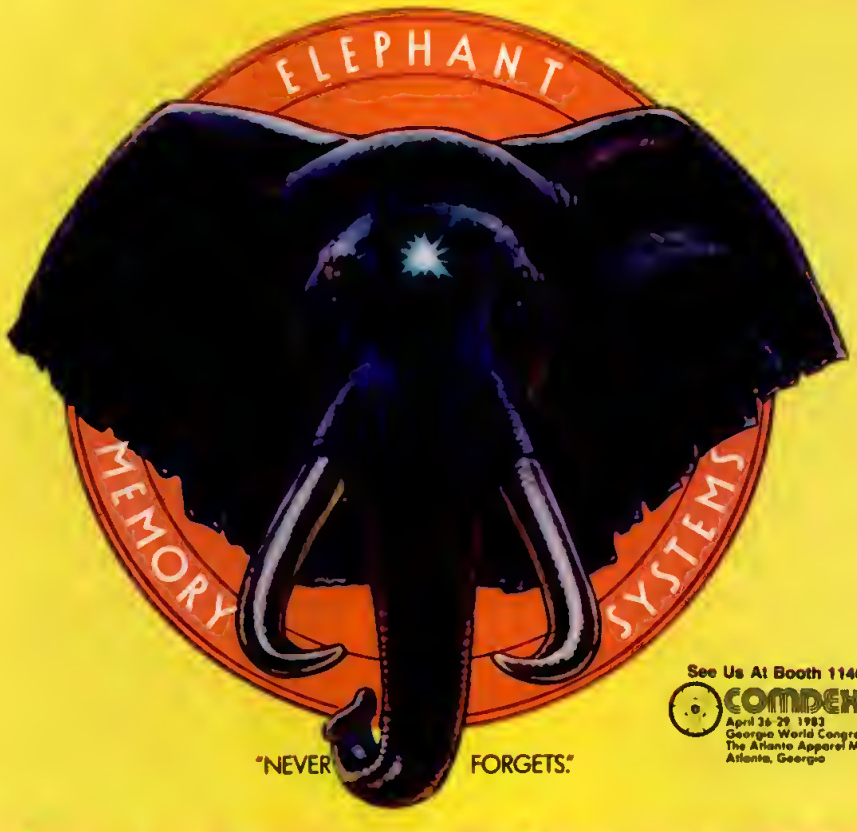

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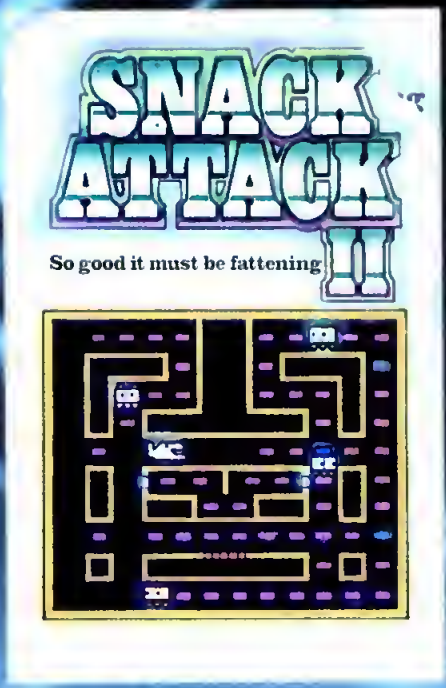

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A spreadsheet war between VisiColc and SuperColc was publicized by this magazine several months ago. At that time, these programs were the big guns while *MultiPlan* was touted as the challenger. Since then, two newcomers have joined the fray: *Torget Finonciol Modeling (TFM)* from Comshare and MicroPlon *(MP)* from Chang Laboratories.

What is interesting here is that these latest programs seem to have raised the power of the spreadsheet program to a higher level. Neither is a "me too" program. Instead of trying to capture a small portion of the market with a version that mimics like their predecessors', both companies have augmented the power and enhanced the ease of use of existing programs. Both offer more tools to create financial models and projections.

Similarities

Both *TFM* and *MP* have an arsenal of commands to set up income statements, balance sheets, and all the other normal spreadsheet applications. They have commands to create tax bracket calculations, different kinds of depreciation, consolidations of corporate subdivisions, variance reporting, pro formo analysis, and much more high-powered financial modeling. Calculations that took several steps and wasted rows in other spreadsheet programs are now built-in single commands. Extended help prompts that cut down the time spent flipping through

menuals are aveileble with e few keystrokas. Each manufacturer also recognized the lerge following of CP/M-86 end MDOS and provided thair packages in both flevors.

Differences

Tbe philosophies taken by eech company on bow its spreadsheet would work are different. *TFM* benefited from the time invested in increasing tha power compared to existing spreadsheets, but most of the designers' effort wes spent on creeting a package thet wes versatila and very easy to usa. Tbe commends use more straightforward English than any other package I have sean, complate with standard nouns, varbs, and adjectives. On the othar hand, *MP* reflects a major effort to include e vast array of commands thet offer e greet emount of spreedsheet power at your fingartips.

TFM provides two weys to entar a table, depending on tha style and preference of the user. You can enter deta into the spreadsheet columns end rows directly, or you can enter your commands one line at a time similar to the way you would write a BASIC program. *TFM* includes a small editor to changa the commands end arguments. *MP* hes the same spreadsheet "program" option to a degree, but it is more of e "prompting" input system. In *MP*, efter eech command is enterad, you have to answer all the prompts for the commend argumants. If e command needs changing, the entire command bes to be deleted and reentered. Many of the differences ere releted to style. Teking a closar look at each package reveals thair strangths and weaknessas.

THE COMMANDS use more straightforward English than any other package I have seen.

Target Financial Marketing

Both the CP/M-86 and MDOS versions of TFM require thet you have 128K RAM and at laast one disk drive. However, two drives make life much eesier. Tha second drive allows for lerger teble sizes end lets you Consolidate sevarel seperata tables into ona combined table. With one drive this consolidation feetura is severaly hampared.

TFM wili work with many different display terminals and printers. If it doesn't, en instelletion program is provided to match your terminal or printer to the spreedsheet. I had to usa the installation program to set up my F9 function key as the Execute key and F10 as tha Help key. (This workad fine once I raaiized that to "install" thosa kay essignments permanantly I hed to make tha changas and then reboot the PC.)

Applications

Many typas of applications are possible with TFM. In fect, Comshare sells an epplications disk for $50 that includes the following models:

Financiel Reports:
- Cost of Goods Sold Schedule
- Sales Expansas Schedule
- General & Administretion Expen Schadula
- Income Statement
- Balance Sbeat
- Financial Ratio Report

Cash Flow Forecast
Acquisition Appraisal
Financial Lavarage
Lease vs. Purchase Analysis
Net Presant Value
Mortgaga Calculations
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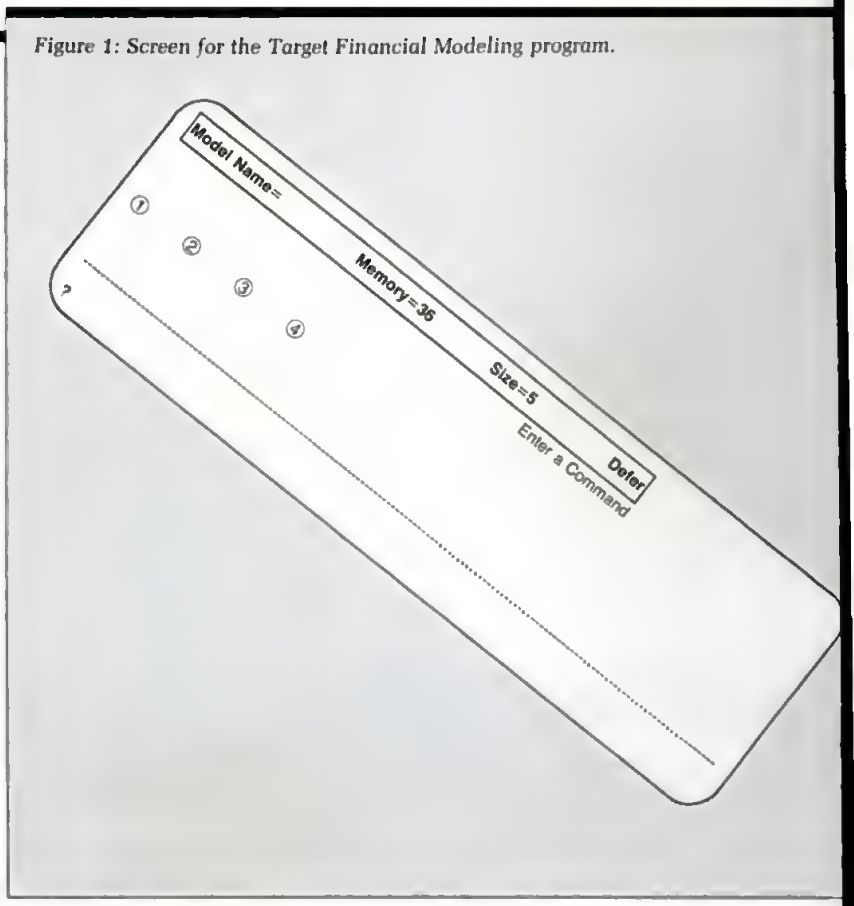
Figure 1: Screen for the Target Financial Modeling program.



TFM ALLOWS a very large table of data if you have the RAM to hold it.

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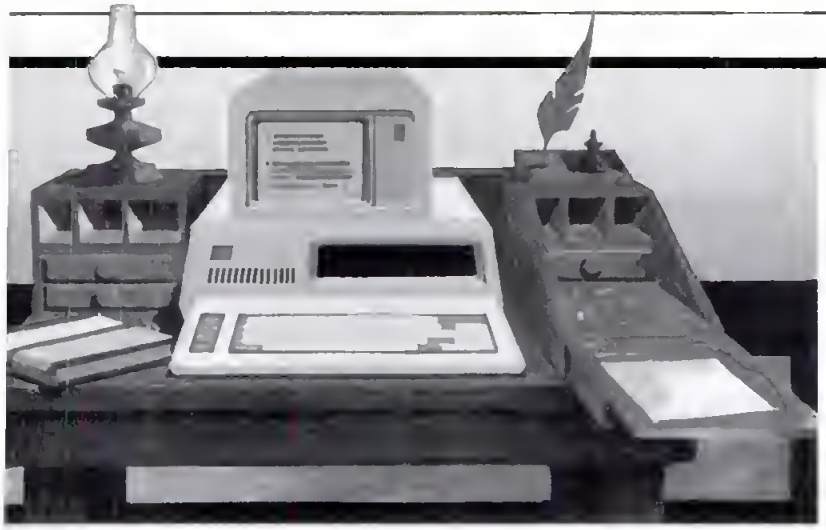

Pro Formo Financial Statements
Consolidation/Planning Forecast

These models plus a few more are
ady set up on the applications disk. I
d a couple of them and they work well.
ability to Input data into a previously
ed model makes repeating the same
lysis on many different sets of data
. The output commands and format capabilities produce a quality report. *TFM* allows you to output the table to an ASCII file if you want to read it into a word processor to make the report look even better. This would be advisable with reports that have a lot of headings, subheadings, and footnotes. I tried this with a report entered into the Benchmork word processor, and everything worked well together.

There are two ways to create a spreadsheet with *TFM*. First is by entering data into the table directly; second is by entering the table commands one line at a time, "programming" style, in a language fairly close to English. Before I explain this option, however, let's see how the screen looks when you first enter *TFM* (see Figure 1). The top line is the guideline (1) and shows the current model name, amount of memory left, number of columns currently specified, and the calculation mode (deferred or immediate). The next line is the status line (2), which

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prompts you when you need to enter e command or dete. The next 18 lines (3) are the display aree where the teble is created and displeyed. The last line is celled the cursor lline (4). It is where the commands are displeyed when entered, end is also where e commend to be chenged appears during the editing mode.

TFM PROVIDES various options for printing or storing your work on disk.

The two different weys to enter e teble are Model Summary end Results. In the Model Summary mode you enter the commands into the displey aree, editing them as necessary. When you are finished or want to check whet you heve entered so far, you can switch to Results to see what the table looks like. This display is more like the stendard spreedsheets. The example given in Figure 2 mekes this clearer: It shows the Model Summary commands needed to creete e "Cost of Goods Sold" schedule for the four quarters of the year. Switching to the Results mode produces e different screen (see Figure 3).

These two entry systems ere updeted simultaneously, regardless of which system is in current use. Any changes or edditions mede while in Results ere autometicelly edded to Model Summary and vice verse.

In both Model Summary end Results there are two modes for entering commends or editing commands. To enter commands, you must be in the Commend Mode, while to edit existing commends you heve to switch to the Displey Mode. In Displey Mode, you move the locetor or cursor to the spreadsheet cell (in Results) or the command (in Model) and press the carriege return. The contents of the cell or command are moved down to the cursor line. You cen then insert, delete, or replece part or all of that commend. The locator is in reverse video end is the length of the column it is located on. mekes for eesy identification of the ce command in question. The position o locator is moved quickly with the G commend, or the four arrow keys ca used to move one column or row time.

TFM ellows e very large table of da you heve the RAM to hold it. The spr sheet cen heve up to 999 columns 5000 rows. You can heve 198 line heedings and footnotes, each up to charecters. You can specify indivi column widths from 1 to 30 charac and up to 30 speces between colu The specing specified between colu can be global (for ell columns) or just certain columns. The cholce of specif e formet for just one row (column) o the rows (columns) is typical of mos the commands in TFM. You can cho up to 28 decimel pleces per velue for pley end from 2 to 20 significant digit calculetions.

Commands

TFM has versetile English-orie commend vocebulary in the Model S mery mode. For exemple, the first lin my model in Figure 2 reads: Heading Cost of Goods Sold. The command ca entered exectly as it reads or it ca entered es follows: Heding 1 is Cos Goods Sold. Any essignment stetem for columns, rows, heedings, subhe ings, and footnotes can use =, ls, or Line 3.0 in my example is a comman sum llnes 1.0 thru 2.5 into the row ti

ROWS AND columns can be rearranged in any order or ignored if desired.

"Cost of Goods Sold." Most spreadsh would heve you enter the beginning to sum, then the ending row to sum, so forth. In *TFM*, you merely type command in English: SUM OF RAW'M TERIAL THRU DEPREC'EXP. You also enter thet stetement with line nu

Figure 2: Example of the TFM "Model Summary" mode.

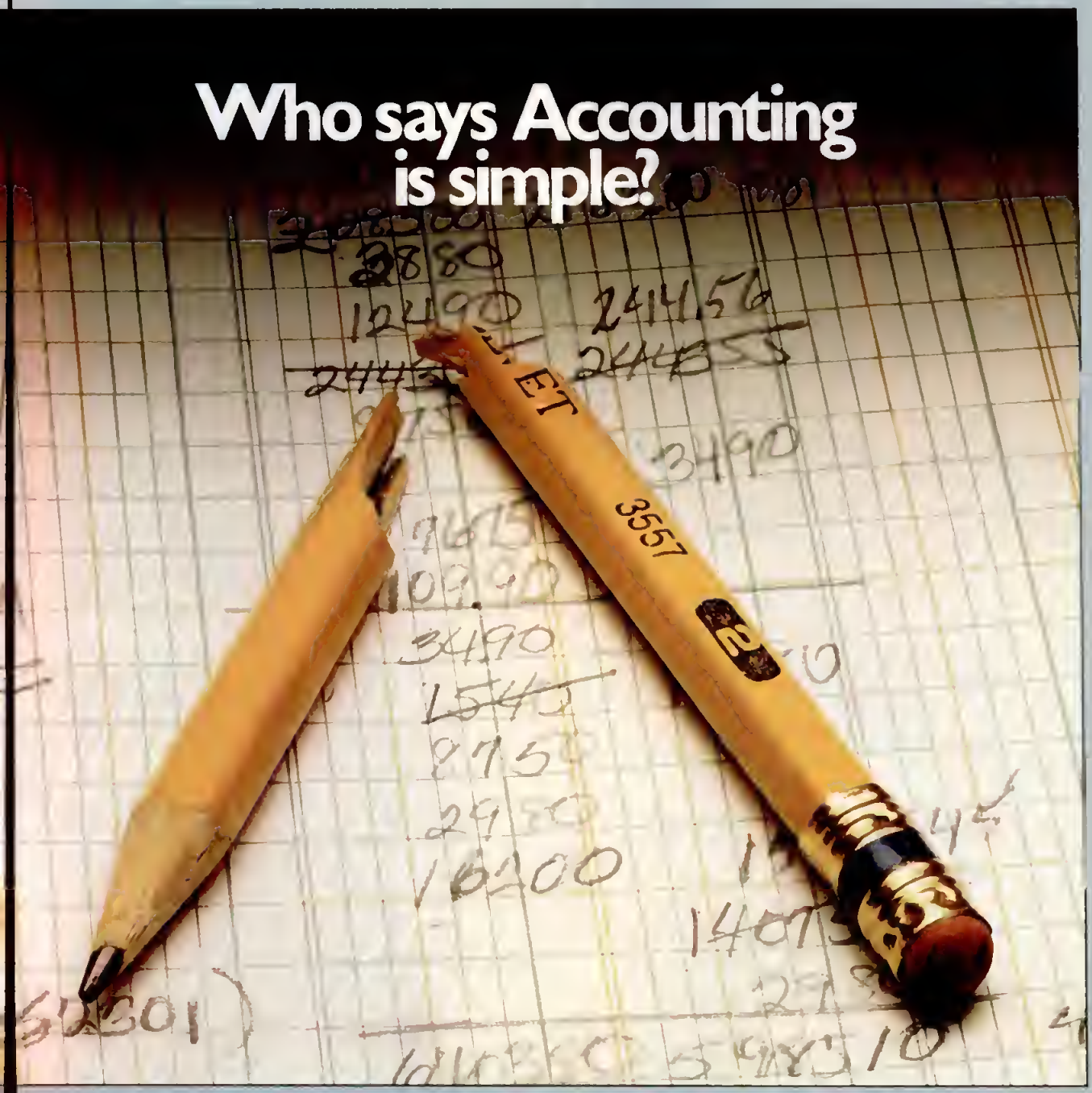
```
Heading 1 = Cost of Goods Sold
Center Heading 1
Heading 2 = 19B3
Center Heading 2
Column 1 SPRING "Spring" =
Column 2 SUMMER "Summer" =
Column 3 FALL "Fall" =
Column 4 WINTER "Winter" =
Line 1.0 RAW'MATERIAL "Raw Material" =1000,1500 for 2,2000
Line 2.0 LABOR "Labor" =500,GROW BY 100
Line 2.5 DEPREC'EXP "Depreciation Expense" = 450,GROW BY 6%
UNDERLINE LINE 2.5
Line 3.0 COST'GOODS'S "Total Cost of Goods" = SUM OF RAW'MATERIAL
    THRU DEPREC'EXP
UNDERLINE LINE 3 WITH =
```

Figure 3: Example of the TFM "Results" mode.

Cost of Goods Sold
19B3

	SPRING	SUMMER	FALL	WINTER
1.0 RAW'MATERIAL	1000	1500	1500	2000
2.0 LABOR	500	600	700	800
2.5 DEPREC'EXP	450	477	506	536
3.0 COST'GOODS'S	1950	2577	2706	3336

Who says Accounting is simple?



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bers instead of row titles: SUM OF LINE 1.0 THRU LINE 2.5. This makes reading a model program written by someone elsa (or even ona of yours written a while back) much easier.

ALL THE financial data for creating the Income Statement, Balance Sheet, and Cash Flow Statement can be put into one table and printed out as three separate reports.

Thare are two basic categorias of commands in *TFM:* data commands, which affect the numbers in the table; and format commands, which affect the way your model looks on tha screen and the printer. Let's look at data commands first. The standard math commands are provided: addition (+), subtraction (−), division (/), multiplication (*), negation (−), exponentiation (X**Y or X^Y), natural log (LN), and power of e (EXP). Other commands are Greatar Of, Lesser Of, Max (Maximum of), Min (Minimum of), Ave (Average of), Cum (Cumulative), Integer (Truncate fractional parts), Sum Of/Thru, and If/Than/Else. Let's say that the tax rate is as follows:

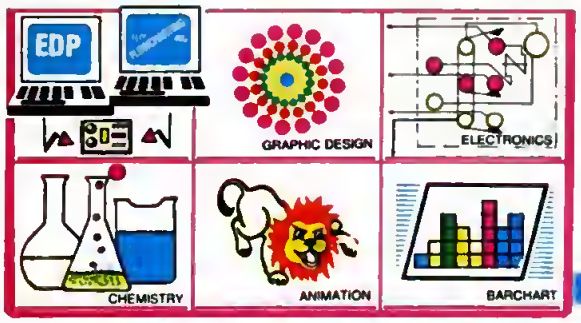
Nat Income	Tax Rate
$50,000+	50%
$30,000–$50,000	30%
$1–$30,000	20%
0	0%

The statement to calculate the taxes due after determining your income would be:

```
LINE 22.0 TAXES = IF INCOME >
          50000 THEN INCOME *
          50%
ELSE IF INCOME >= 30000 THEN
          INCOME * 30%
ELSE IF INCOME >= 1 THEN INCO
          * 20%
ELSE 0.
```

Another important command is Grow By. Numbers can be entered into the tabl as constants, or you can use the Grow B command to enter a base value and hav

THE ERASE command deletes old or unnecessary tables.



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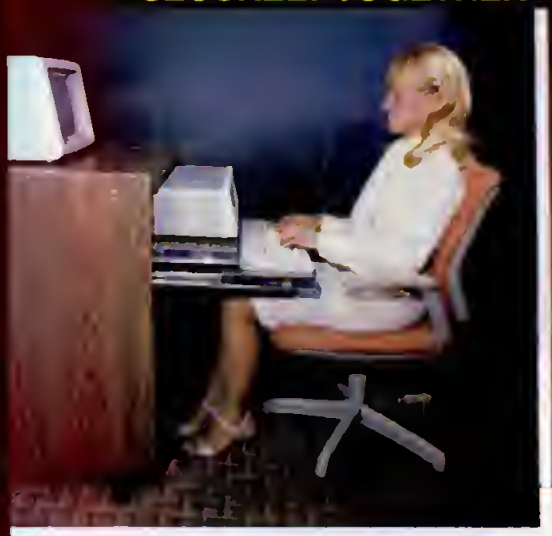

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hat value eutometically incremented by a percentage rete or a constent. The first number is entered into the table elong with the percentega rate (X%) or increment velue (+X) that the number will grow by. You may not went all the defined rows or columns to be affected by Grow By; in this case tack For X onto tha statement where X equels the number of rows or columns that you went effectad.

Two finel dete commands are Input and Keep. Input is usad whan dete is entered in a model that will be used for repetitive analysis. Anytime the model is processed or calculated, *TFM* will stop and prompt you to enter the dete. Entering tha Keep On command "keeps" the last number entered for Input in memory, and the program stops asking for new informetion each time the model is celculated. Keep On is autometically reset when you leava *TFM;* you cen reset it within the system by entering Keep Off.

Formatting the screen and printer output is easy. Referring to Figure 2, the row or column name in caps is what eppaars on the screan, end the neme in quotas is what is printed. You can defina up to 198 headings end footnotes, eech up to 240 characters long. Even though only the top three heedings are shown on the screen, all of tham will ba printed. Subheedings

COMMANDS that could be destructive to existing data always warn you so you do not do something unintended.

can be inserted in tha middle of tha model, but unfortunetely they cannot be centered or pleced mora than ona to e line.

The command Show With $ is used to displey dollar signs. Similarly this command can be usad to displey commas and parenthesas (for negativa numbers). To defina tha numbar of dacimal placas, you usa a command such as Decimals Are 3. All velues can be shown with the chosen options or you can selectively choose particular rows and columns. But you cannot define thasa and similar options over e ranga of rows (columns). Currantly, if you want to show helf of the rows with two decimal places, you have to assign eech indivldual row using e commend such as Decimals Are 2 For Line 12.0. A command such as Underline Line 12 With x and Overline Line 12 With x prints e row of x under or over line 12 whare x is any keyboard charecter. Entering Skip n After lets you spece between lines where n is tha number of lines to skip. You cen jump to the next pege using the Pege command. Even though tha various format commands creete e nice-looking printout, thay tand to fill up the screen so thet fawer rows of information ara shown et one time. To turn off the formets temporarily so that thay will not show on the screen, press Formets Off. Formats On returns the format commands to the ective state egein.

Report Generation

TFM provides various options for printing or storing your work on disk. Entaring the Print commend brings up e print menu. Rows and columns cen be rearranged in eny ordar or ignored if deslred. You can choose whicb heedings to print and whether or not to include footnotes. Thase options allow you to build e large combined teble of informetion, yet print it out in separate parts. For example, all the financiel data for creeting the Income Statement, Balance Sheet, and Cash Flow Stetement can be put into one table and printed out es three separate reports. The print options salected can be seved under a report name end recalled leter for tha same type of report.

A WHOLE group of expenses can be judged against future cash flows for investment analysis.

It's possible to print the Results spreadsheet, the Modal Summary of commands, or both. Row neme titles or titles enclosed in quotes can be printed. You can choose to beve the formet commends active or inactive during tha printout. Page length, number of line feeds, top of form, number of lines in tha top and bottom margin, page width, and whathar or not to use continuous forms are all selactable from the print menu. Tbare is evan e conditional print option. For axample, if e spreadsheet cell value is negativa, then do not print.

THE MANUAL IS very well written with lots of examples.

The Davica option in tha print manu allows you to select a devica diffarent from tha printar (dafault davice). Thus you can output tha tabla to e disk fila for leter usa with a word processor. A tabla sent to disk is in ASCII form and cennot be reentered into spreadsheet.

File Management

TFM keeps track of ali tebles by tegging "TGT" onto the end of file names. For instance, tha tabla namad Winncoln is stored on disk as WINNCOIN.TGT. This allows tha program to show only the fila names of tables when the Directory command is antered. The Erase commend dalates old or unnacassary tables. You can review or modify a previously stored tabla by RECALLing lt lnto TFM. And of course, antaring Save file name will store the curent teble onto disk with the specified name. If you went to clear the screen for e naw table, you type in Create. Commands that could be destructive to existing data always warn you so you do not do something unintended.

Special Features

Four faatures deserve speciel recognition. *TFM* bas a Net Present Valua function (NPV) that calculates the difference between two present values judged against a rate of return that you anter. A whole group of expensas can ba judged ageinst future casb flows for invastment enelysis. Column and row referencing is also available. This allows calculetions to be made on a coiumn or row one coiumn ovar or ona row up. The raferences can be absoluta or reletiva. For example, Line 1 [5 column] references tha velua from line 1 and column 5, end Line 1 [−5 column] references tha valua from lina 1 and 5 columns to tha left. Calculating Aging schadulas for Accounts Receivabla is easy using column and row refarencing. It is elso possibla to refarenca whet *TFM* calls "History" cells. Thesa are columns of information used only for refarencing that stert to the ieft of column 1. You can go back as many periods as you need. This is helpful for besing present velues on past numbars that you do not want in your current table, sucb as past salas figures.

The third spacial feature ls an importent one for people intarestad in combining several Income Stetament tables into one consolidated Income Stetement. The Output command lats you sand part or all of a table's data to a disk fila for latar consolidetion. You can even send just 65 pe cent of the values with the Output cor mend if your company only owns 65 pe cent of the stock in a subsidiary. Th weighting functon makes complicate consolidatad incoma statamants muc aesier to davelop. Tha last command ls What/If command that allows you changa any one value ln a table and the recalculata the results. Tha changa do not permenently change your model, b is only for doing analysis of different si uations. If you are intarestad in seeing th effect of higher Spring sales figures, yc would antar WHATIF SALES [SPRING] 4000, and the wbola table would be reca culatad using that naw valua.

Ease of Use and Learning

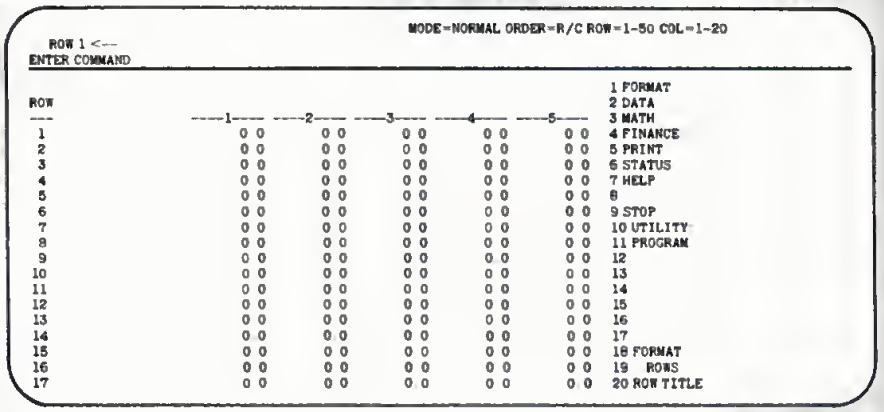
I found thet I had reletively little tro bla getting up and running on the Cor shera program. I hed the one problem mantioned aarlier trying to set up m function kays correctly, but all of my oth er problems occurred whan I dld not fo low instructions in the manual. The mar ual is vary wall writtan with lots of exam ples. It is sat up into sevaral cbaptars an some appendicas. The first is a tutoria chapter to gulda you quickly through th capabilities of TFM, intaraction with th

MICROPLAN is a financial programmer's dream.

system, reeding the screen, end other ger erel information. Tha remainder of th chapters teli you in deteil how to use eac command, with examples includad. Th appendices includa a command dictio nary, a list of tha error messages and wha they mean, how to "install" your termina and printar to the TFM system, and e com pleta index of all terms and command and whare to find them. Most command cen be antered by typing only tha firs three letters of the command. This reall speads up what could otherwise be th slow, tedious task of satting up a tabla.

One last faature that makes *TFM* aas to laarn end usa is the automatic help sy tam in tha software. No matter wbere yo

Figure 4: Screen for the MicroPlan program.



in tha spreadsheet program, pressing 0 takes you to the appropriata help enu. If you are in the middla of an edit d you forget what to do, pressing F10 ill give you a list of tha diffarent edit mmands and directions on how to gat ore detailed instructions on aach edit mmand. Responding, for example, th a query on Insarting producas an planation on the scraan of how to sert.

mpediments

If I could, I would definitaly change a w procedures on *TFM*. First, I would low for definition of Decimals, column idths, spacing between columns, and so with ranges of columns (rows). It is a al problem to have to enter in each colnn if you do not want to have all colnns the same. I found that if you adit a ne with a subheading attached to it, the bheading disappears. I undarstand that you dalete the line entirely, the subading should be deleted also, but when u are only making a small change, it is a isance to reenter the subhaading each me. I would also like to hava seen tha ility to protect certain calls or groups of lls similar to the option in SuperColc. nother option *TFM* presently lacks is e ability to enter centered subhaadings thin the body of a table.

icroPlan

Both the CP/M-86 and MDOS versions MicroPlon requira a minimum of 96K

YOU CAN easily send ASCII copies of the report to a disk file for later use by a word processor.

AM. Of coursa, tha more memory you ave, tha largar your tabla can be. Tha anual statas that tha *MP* programs taka p 120K of disk space. You naad about 2K more for systam files, which leaves 8K if you are using ona 160K disk drive. This doesn't leave room for a very big table so I recommend that you use two 160K disk drives (or one 320K driva). I usad just one 320K drive for my analysis. The program works with a variety of terminals and printers but, to match them up correctly, the manual instructs you to call the manufacturer.

Applications

MicroPlon is a financial programmer's dream. The spreadsheet comes packed with powar. It is full of commands to do just about any kind of financial analysis. From cashflow planning to built-in tax schedules with carry-over tax-loss capability, the commands are available for a multitude of applications. Chang Laboratorias offers a Tables Module package availabla that you can buy separately. The module package makes threa differant kinds of consolidations possible, does varianca analysis, and develops complex models. The company also salls Solution Books that includa tables for various financial situations, including real estate analysis, budgeting, and sales forecasting. Tha print options available are comprehansiva and can produce a profassional-looking report. You can easily send ASCII copies of the raport to a disk file for later usa by a word processor. The ability of *MP* to handla so many different financial applications easily lies in the power of its many commands.

Data Handling

Chang Laboratories has taken a unique approach to creating and manipulating a spreadsheet. All commands are entered with a number. The numbers range from 1 to 127, with each number represanting either a command or a command group

CHANG Laboratories has taken a unique approach to creating and manipulating a spreadsheet.

title (some numbers ara not used). There ara eight command groups: Format, Data Entry, Math, Financa, Print, Status, Utility, and Program. Aftar antaring tha command number, *MP* prompts you for any required additional information. For exampla, to sum a number of rows together, you entar 55. The program then responds with tha prompt "BEGIN ROW (1-50):"; after antaring 4 as an exampla, the next prompt is "END ROW (4-50):". *MP* than takas your last row, calculatas tha sum of tha chosan rows, and puts the answer in the present row.

When *MP* first comes up on the screen, the top row is the status lina (see Figure 4). Tha moda information, row/column calculation order, and tha number of salactad rows and columns in tha table are shown on the status line. This line will occasionally show any error or system message in reverse vidao. Tha next

line displays the current location of the cursor. The third line is the command line where you enter the command number and any additional information. The rest of screen is divided into the table itself and e menu window. Tha menu window constantly displays the commands and their corresponding command number. The table display araa show 17 rows at a time. You can change the rows and columns shown by using either commands or Escape/arrow sequences to move up, down, left, and right. The GOTO command will take you to an exact cell. The current cell is indicated by an inverse-video block that is called the cursor.

MP works in two modes, Normel end Program. When in Normel moda, tha tabla works lika any othar spreadsheet: ell the commands ara stored in tha table. Tbe table is generated es the commands ere entered. In Program mode, ell commands are stored in a spacial place in memory capable of saving 100 steps. These steps

THE PROGRAM mode is extremely helpful when you want to work with a certain table again and again.

are simply a saquenca of commands that can create, load, modify, and/or print tables. The Program mode is extremely belpful whan you went to work with e cartain tabla again and again. A program can be created thet can load a praviously savad Income Statement table, prompt tha usar for naw data, modity the table, then print and save tha modified Income Statemant.

Very large tebles can be craated and stored, depending on tha size of tha availabia RAM and disk storage. With tha SETUP commend, the program asks you to enter tha number of columns you desire from 1 to 99; it then calculates the maximum number of rows possibla by taking into account the amount of RAM left. Figure 5 shows some examples of the sizes available if you have 256K of RAM.

Unfortunetely, this command does not work quite right. If you pick tha maximum numbar of rows or enywhere near it after choosing the number of columns, the system dies completaly or dies while giving you an error message, and you hava to reboot your PC. If, for exemple, you choose 99 columns and then pick 30 rows, everything will be okey. On tha other hand, if you choose 99 columns and 40 rows, the system crashes.

Commands

Tha first of the eight command groups is tha Format group. Thesa commands iat you sat up row titles of up to 40 characters and column titles of two lines having up to 20 characters each. The Set Typa commands select the typa (blank iina, data, subheeding), kind of underlining if any, number of decimel pleces (up to 3), and othar speciel formetting for each row or column. You can exchange rows or columns with tha Reorder command. The last two Format commands, Show Rows and Show Cols, list the current formet specifications for each row or column.

Tha next group consists of the Data commands. The main command is Enter, which allows you to enter values into the tabla quickly. The values can be constant or grow from a base value by increments or by a percentage rata. You can also enter values one at a time like sales figures for past periods. Changing a table value is easy using Chenge. Use the Select Col, Select Row, and GoTo commands to move the cursor position and screen display. The Fix command will calculate the results for just one row or column. MP provides two commends for mathematical equations to calculate the data of e row or column. Formula and Plug prompt you to enter a formula that can reference antira rows or columns or a particuler cell. The formula can use all the regular math functions such as *, /, +, and −.

Tha Math and Finence comman groups are probably the most powerful

VERY LARGE tables can be created and stored, depending o the size of the availabl RAM and disk storage

eny spraadsheet end finenciel modelin program available. Below is a list of th commands availeble from these tw groups.

MATH:	FINANCE:
ADD	SET DEPR
SUBTRACT	DEPRECIATE
MULTIPLY	SET LOAN
DIVIDE	LOAN
NEGATE	DCF
INVERSE	IRR
INTEGER	RATIO
ROUND	% OF TOT
CUMULATE	PCT
ABSOLUTE	K PCT
ADD K	LAG
SUB K	LEAD
MULT K	GROW
DIV K	SAVINGS
SUM	SET SCHED
GET	DO TAX
FLOOR	
CEILING	

Most of the commands ere obvious to what they do but soma need addition explanation. The Math commands with K after them allow you to use e constent work on a row or column. Get takas valu from other rows and columns and pu tham in the presant row or column. Flo and Ceiling taka an axisting row/colum and replace any value lowar or high respectivaly than a prompted minimu maximum with that miminum/max mum. For example, by initiating tbe Flo command, the following questions wou be displayed: "What row/column shou be worked on?" and "Whet is the min mum value?" Once the questions a

Figure 5: Example of the sizes af rows and columns available to a MicroPlan user with 256K RAM.

```
Enter # of Columns (1-99): 1
Enter # of Columns (1-99): 5
Enter # of Columns (1-99): 13
Entar # of Columns (1-99): 99
Enter # of Rows (1-726): 10
Enter # of Rows (1-512): 10
Enter # of Rows (1-321): 10
Entar # of Rows (1- 58): 10
```

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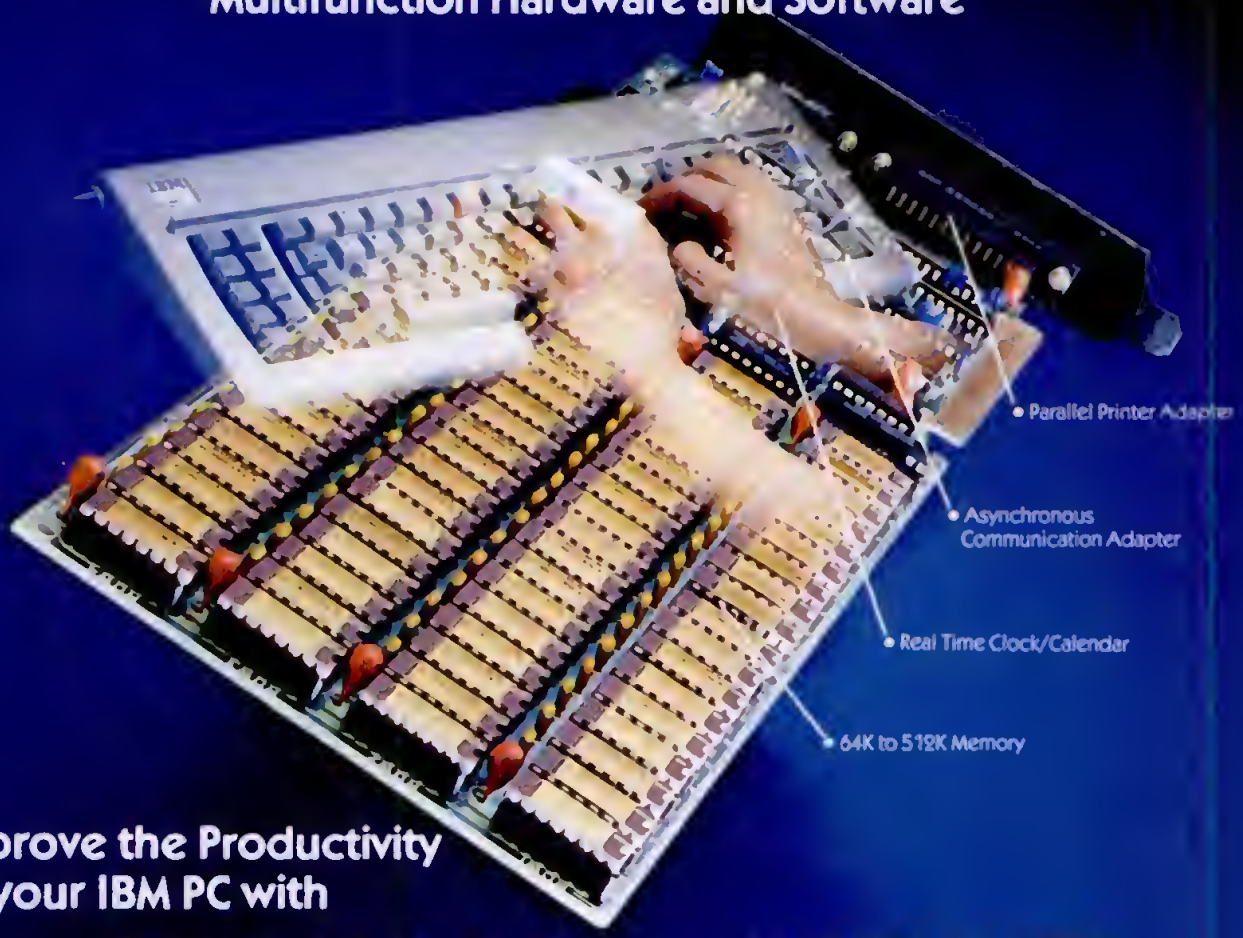

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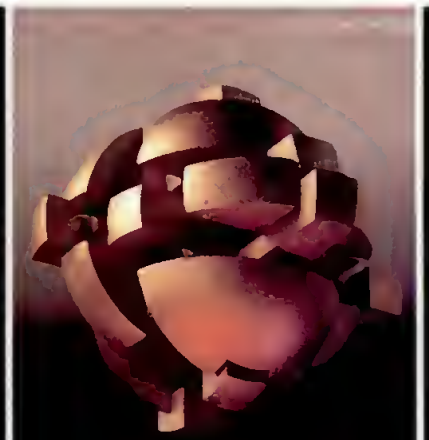

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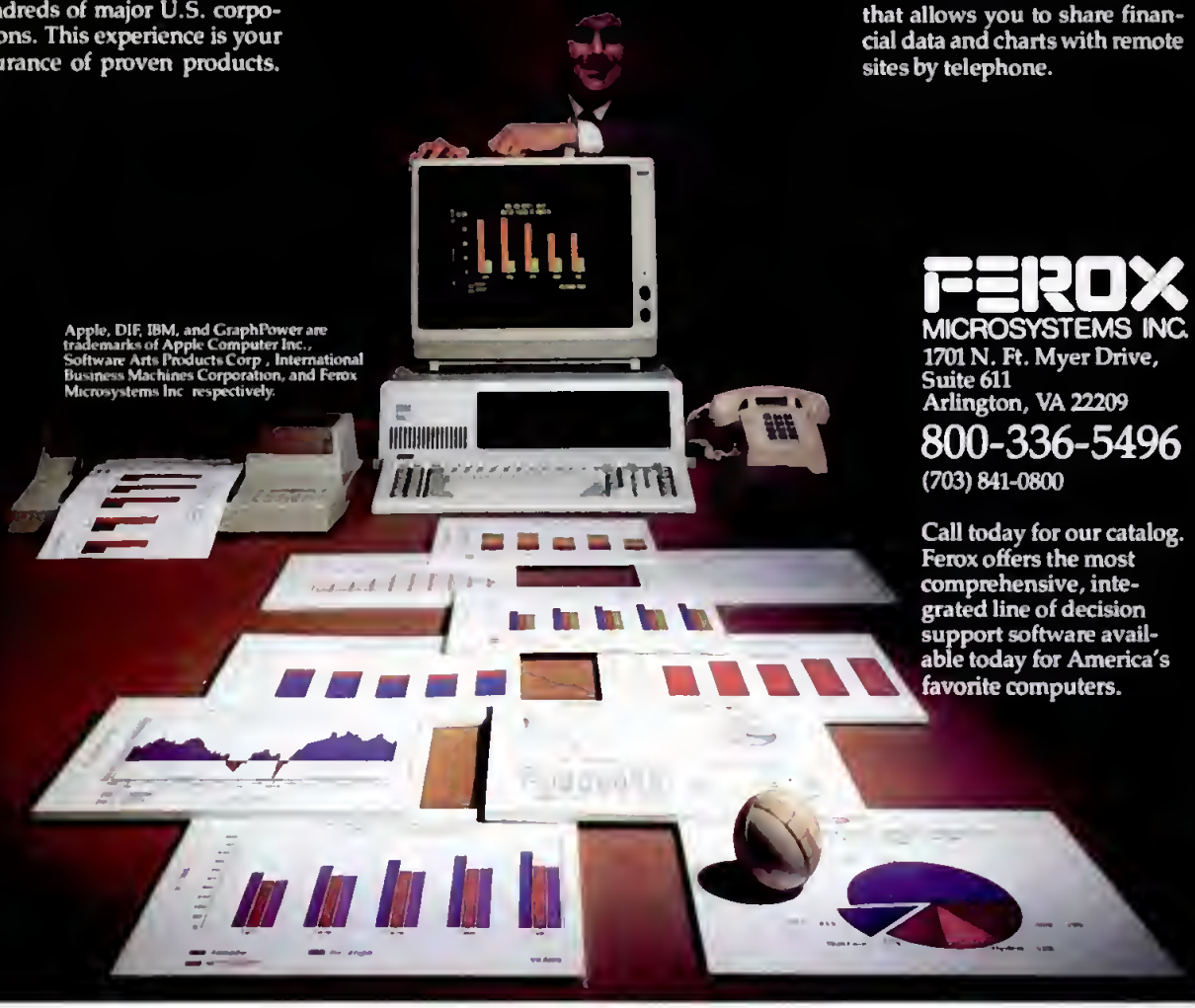

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nswered, any velues lower than that inimum would be replaced wlth the ew minimum.

The Set Depr end Depreciete com-ands sat up depreclation emounts using ny of four deprecletion schedules: sum f the digits, straight lina, double declin-g balance, end double declining bal-nce with eutometic swltch over. Inputs

WITH SOME clever manipulations of the commands, you can carry income losses forward against future income profits.

r book velua, lifa, end selvege value are l prompted for and put into some used row. *MP* uses pre-set formules to ura emortlzations for fixed peyment ortgeges end equel principel peyment ans with the Set Loen end Loan com-ands. Tha progrem prompts for loan pe, terminel belloon peymant emount, rm of loen, end ennual interest rete.

The DCF command allows you dis-unt cesh flows for different lnvest-ents and projects by asking you for the scount rate end the cash amount's row. u cen even determina the internel rete return with Irr. Entering different owth retes for different perlods ls eesy ing the Grow commend. Using the Leed d Leg commands lets you shift deta m different periods, thus feciliteting shflow projections and eging of Ac-unts/Receiveble. One last command et I personally wes pleesed to see ciuded is Do Tax. Aii you heve to do is t up the tax brackets using the Set Sched mmand. You enter the number of ackets, the upper limit end tax rate for ch bracket, end the tax rete for lncome ove the lest brecket. With some claver anlpuletions of the commands, you can rry income losses forward against ture lncome profits, thereby reducing ture tax burdans.

There is one commend group thet will obebly be used frequently once you come femiliar with ell the commends. Program commands let you store up to 100 commands in e speciel eree ln memory. These program commends, or staps, can be stored on disk for lete ratrieval. Tbere are meny edventagas to being eble to creeta, store, end run progrems. You can creeta e skeleton income stetement program thet can be used es many times es you need. Let's sey, for example, thet you ere the controller for your compeny. You know whet your meterlal costs and edministrative costs are as a percentege of selas. You elso know the tax breckets end rstes. You can creete e program thet prompts the user for the sales figure end any fixed costs, the before taxes lncome and after taxes income, end generate e printed report. Now eech tlme you went an Incoma Statamant, you loed tbe stored income progrem, enter the dete, and out comes the raport. The different progrem commends let you loed, save, print, clear, show, llst, end erase programs.

The Stetus commend group conteins a variety of commands to select the operst-ing mode of *MP*. Program shifts the spreadsheet into the progrem "learning" mode where every subsequent command entered will be stored in the program memory. If a progrem elreedy is in mam-ory, tha systam asks you which step you went tha next commend to follow. This ellows inserting staps in existing pro-grems. The Delete command ereses one or more steps from tha progrem. When you are finishad antering the program steps, antar Normal and the systam raturns to the spreadsheet mode. Tha Run Pgm com-mand runs e program thet you heve creet-ad or loeded from disk. *MP* hes some com-mands thet restrict leter commends from working on any rows/columns except the ones thet you specify. For example, if you have 20 columns of dete but you only want to sum the rows in tha first 10 col-umns, you enter Col Range and choose columns 1 thru 10 es the "active" col-umns. Now wben Sum is selected, it will only sum columns 1 thru 10 and leeve 11 thru 20 elone. The last command in this group, ORDER, selects the computing order, whicb can be row only, column only, row first then column, and column first then row.

The next group gives you commends to work with completed tables. The Util-ity commands let the spreadsheet user save, llst, print, end erese tebles. Load All and Save All load end seve both e pro-gram and the table created by the pro-grem. If you have e PC with two disk drives, entering Sat Drive selects the drive wbere all programs and tebles will be stored and retrieved. Clr Date areses the deta on the teble but leeves the pro-gram steps elone; Reset ereses both. Set Up, wbich I mentioned earlier, is includ-ed in the Utility commands.

There are two instructions not includ-ed in any command group. The Help com-mand prompts you for the commend number for which you need help. The system then displeys three lines of infor-mation on wbat the command is end how to use it. The other lnstructlon ls vital to those of us wbo do not like to reboot to get out of a progrem: Stop. The only com-mand group we haven't covered is impor-tant for creetlng professionel printed reports.

Report Generation

The Print commend group selects the various options that affect your printed report. Most of the options affect only the printed report end not the screen. Some of the print options heve to be selected using the Set Type commend dlscussed earlier. Options ls e cetch-all command thet sets up global defeult condltlons end special print options. Uslng thls command, you can set the row description width (4-30); column widths (4-20); number of col-umns per printed pege (1-20); number of decimel pleces (0-3); whethar or not to

AFTER YOU have entered all the information, the report prints automatically.

eutometically omit zero rows; bow to print zero values (0, blank, dashes); which column to print row descriptions after (0-9); how to show negetive numbers (−N,N−,(N)); continuous print or peuse between peges; whether or not to print commes; double or singla spacad; and whether or not to omit row end column numbers on the printout.

With the Titles command, you can

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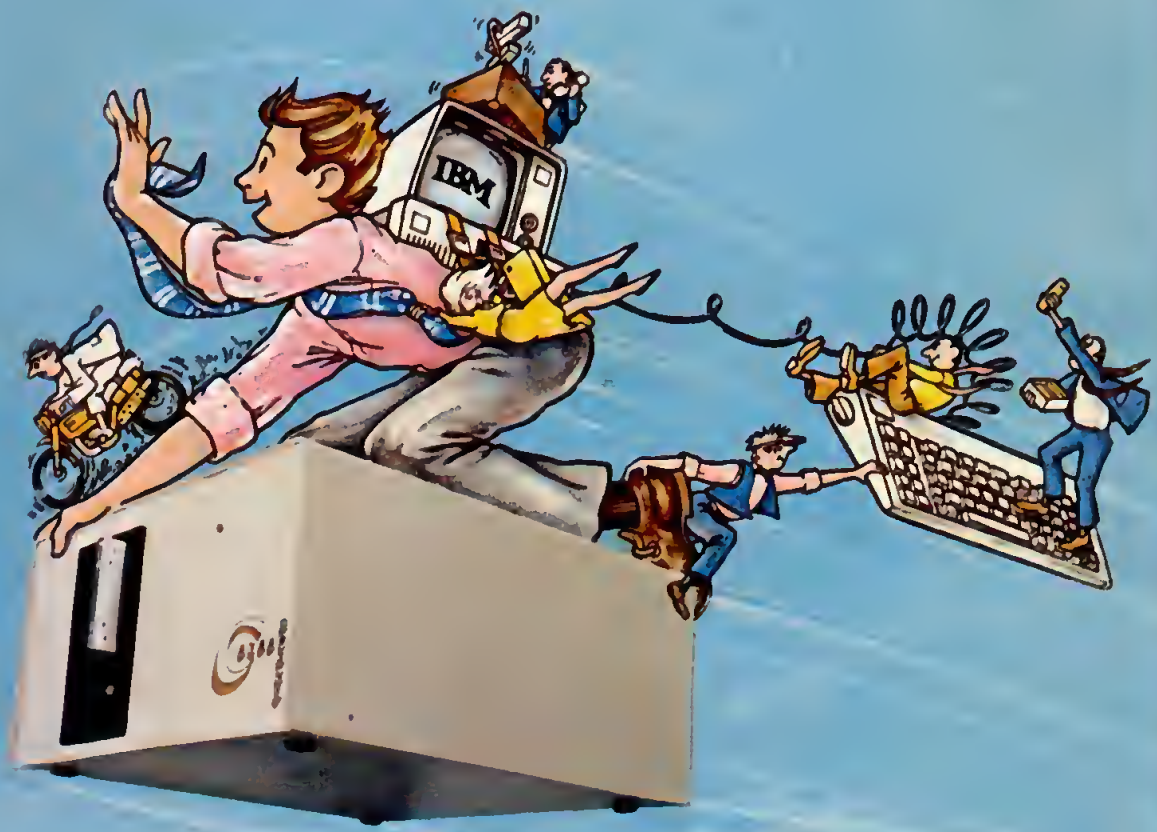

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- **CBASIC2**[5] **& CBASIC86**[5] compilers... for aficionados of useful BASIC.

The software is available on a variety of industry-standard Operating Systems including CP/M[5]-MP/M[5] (both -80 & -86), OASIS[6], PCDOS, and UNIX[7]. Inquire for specific details and prices.

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Affordable and loaded with all the features of printers costing twice as much, the Transtar 130 letter-quality printer retails for less than $900. But it's up to you: Is 42 seconds really worth $1000?

Transtar

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Now, for the IBM: The FinalWord!

The only word processing software package you'll ever need

How could anyone call their word processor The FinalWord? Take the best features of the most popular word processors, combine them and add a few more in one text editor/formatter and you'd be off to a good start. Then, write the program in C to allow user customization and make it capable of supporting any printer on the market and you'd be ahead of everybody else. If you went one step further and made your word processor transportable from one terminal to another you'd have—The FinalWord.

Supports multiple printers: The FinalWord allows you to produce high-speed draft copies on one printer, and letter-quality on another. It also means you'll never need another version just because you bought a new printer.

User-installable on different hardware: With The FinalWord you can upgrade your system and still have a familiar screen display. And since we've written The FinalWord in C, new versions are available almost as soon as new computers.

Features that put you in control: Look at what you get with The FinalWord: automatic generation of Table of Contents, Index, footnoting and chapter/section numbering; enhanced command sets (delete/move a letter, word, sentence, paragraph, page); multiple buffers and windows, deletion recovery, true proportional spacing and more. And because we wrote The FinalWord to be easily reconfigured for different systems, our price can be lower.

Features	The FinalWord™	WordStar™
Full-Screen Editing	Yes	Yes
Directory Access while Editing	Yes	Yes
Simultaneous Printing while Editing	Yes	Yes
External Commands while Editing	Yes	Yes
Video Highlighting	Yes	Yes
Automatic Footnotes	Yes	No
User-Defined Commands	Yes	No
Multiple File Editing	Yes	No
Deletion Recovery	Yes	No
Supports Multiple Printers	Yes	No
Crash Recovery	Yes	No
Dynamic Include Files	Yes	No
Suggested Retail Price	**$300**	**$495**

The FinalWord for the IBM personal computer requires 64K, IBM DOS, and a printer or communications adapter; otherwise, The FinalWord requires a 56K CP/M system and any video terminal with cursor positioning character sequences. It is presently available in 8" standard format for the TRS-80 Model II, Vector Graphics and Altos 5ystems. There are compatible versions for the HP-125, Xerox 820, Cromemco, Micropolis and Dynabyte Systems, and there are 5¼" versions for the Heath/Zenith Z-89, Northstar, Apple and Superbrain. **Coming Soon: The FinalWord for the DEC Personal Computer.**

The FinalWord is available through leading retailers, Westico, and Discount Software, or directly from:

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Dealer and OEM inquiries invited.

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CIRCLE 301 ON READER SERVICE CARD

choosa to have e paga numbar in the uppar right cornar of tha report and/or print tha currant data in the upper laft corner, the range of rows to print, the renga of columns to print, and up to threa lines of title information that is automatically centerad et tha top of aach raport. Aftar you have anterad all tha information, tha report prints automatically. If you want just a rough copy of tha raport, you can use the Report command to get a printout without heving to answer all the prompts. With Sat Typa, Options, and Titlas, you can sat up your report to look just about any way you like. Anytime you went to sea what options hava baen salectad, antar tha Show Opts command and the formatting information will appaar on tha scraen. Tha last command in this group, Sava Rap, sands a copy of tha formetted report to a disk fila for use with a word processor.

File Management

Each file nama consists of eight characters with a three-lattar tag that identifies whathar tha fila is a table or a program. Standard MDOS naming convantions hold trua whan naming tha filas. When loading, arasing, or saving a table

MP STILL has more power in its commands than any other spreadsheet I have seen.

or program, MP lists tha existing filas on disk ona at a tima. To get the entire directory of tablas or programs, you hava to use the LIST PGMS or LIST TBLS command, which sands the list to tha printer only.

Speciol Feotures. Except for ona, all tha faaturas that I consider special ara in tha Finenciel command group. Having built-in commands to work with different loan situations, dapreciation schedules, and tax brackat calculations is exceptional. I also see the Formula command as a vary usaful feature that can be used whare thare does not seem to be an axisting command to handle the problam. Whan the Sat Up command is corrected by Chang, that also will become a "special feature" on my list. I like tha fact that tha computar automatically calculates the largast siza table that the memory will hold.

Ease of Use and Learning

I found starting tha program end antaring a table immediately was aasy with *MP*. Tha basic commands are simpla to learn and, with the commend manu always displayed at tha right, you can always remamber which command is which. Howaver, the programming commands are a little hardar to learn.

Tha manual is not organized vary well. Tha first chaptar guides you through an aasy example to gat you oriantad. Howaver, the following chaptars presant tha command information in e confusing manner. Thara doasn't seem to be any ordar in which they introduce the commands. Soma of tha commands do not aven hava examples with them. One command is listed in tha index but doasn't show up in tha manual (the Sevings command). With a good manual that explains aach of tha commands end thair options and gives examples, MP would ba a breeza for a novica to usa, since all required input is promptad for once you start. With so meny first-tima computer usars eround, e well-organized manual with numerous axamplas is a must!

Impediments

There were no major impediments I could find with *MP*. However, thera ware saveral littla annoyances. Tha manual was not up to par. Soma commands had no examples, one command was omittad entirely, and a coupla of tha commands did not avan work the way tha manual described. I was working with e program that had nina staps, and I kapt trying to insert an Enter command in the middle, which I had dona aarliar in tha same program. But in this case I could not gat it to work no mattar how many timas I tried. I had to arasa and re-anter the whola program to finally make it work. Also, I had troubla satting up the Cancal kay. Tha command was supposad to be initietad with tha "Del" kay, but it navar workad. I finelly printad out tha halp file and noticed that I could usa "Control A" as a Cancel also. This problem could have baan avoidad with an appandix in the manuel that explains exactly how to install tha keys with the software. Another thing that botharad me is that every now and then certain commands erase tha top status line and tha program will not restore it aftar tha command is done. Finally, I think tha program could use soma work on its display routines to make

TFM REMINDS me of the experienced, crafty boxer who has many different moves in his repertoire.

antries appaar naatar on tha screen. For instanca, when you display program steps on the screen, thay are placed in the middla of tha table with the rest of the table still displayed all around the program listing. This is distracting. The display should ba blankad befora the program is listad. When the program staps no longar naad to be displayad, tha screen should ba blanked agein and the table than restored complete with a naw status line.

Nona of these small problems are really sarious; you can work around all of tham. I suspact that most of the problems are a rasult of transfarring tha system from CP/M (which it was first writtan for) to MDOS. Tha version I hava is 3.1, and I was told thet varsion 4.0 will soon be introducad. Hopafully most of thase problems will ba corrected. Daspite its problams, *MP* still has more power in its commands than any other spreadshaat I have seen.

Comparison Summary

In trying to describe both these spreadsheets, I could not help thinking of two boxars. *TFM* reminds me of tha experienced, crafty boxer who has many different moves in his repartoire. His movamants are smooth and easy. *MP* has tha personality of tha stocky, muscular boxer: *MP* just keeps coming at you with ell of its commands. Both spreadsheets are capabla opponents. As with many software packages, the choice that the buyer makes may come down to his personal style. /PC

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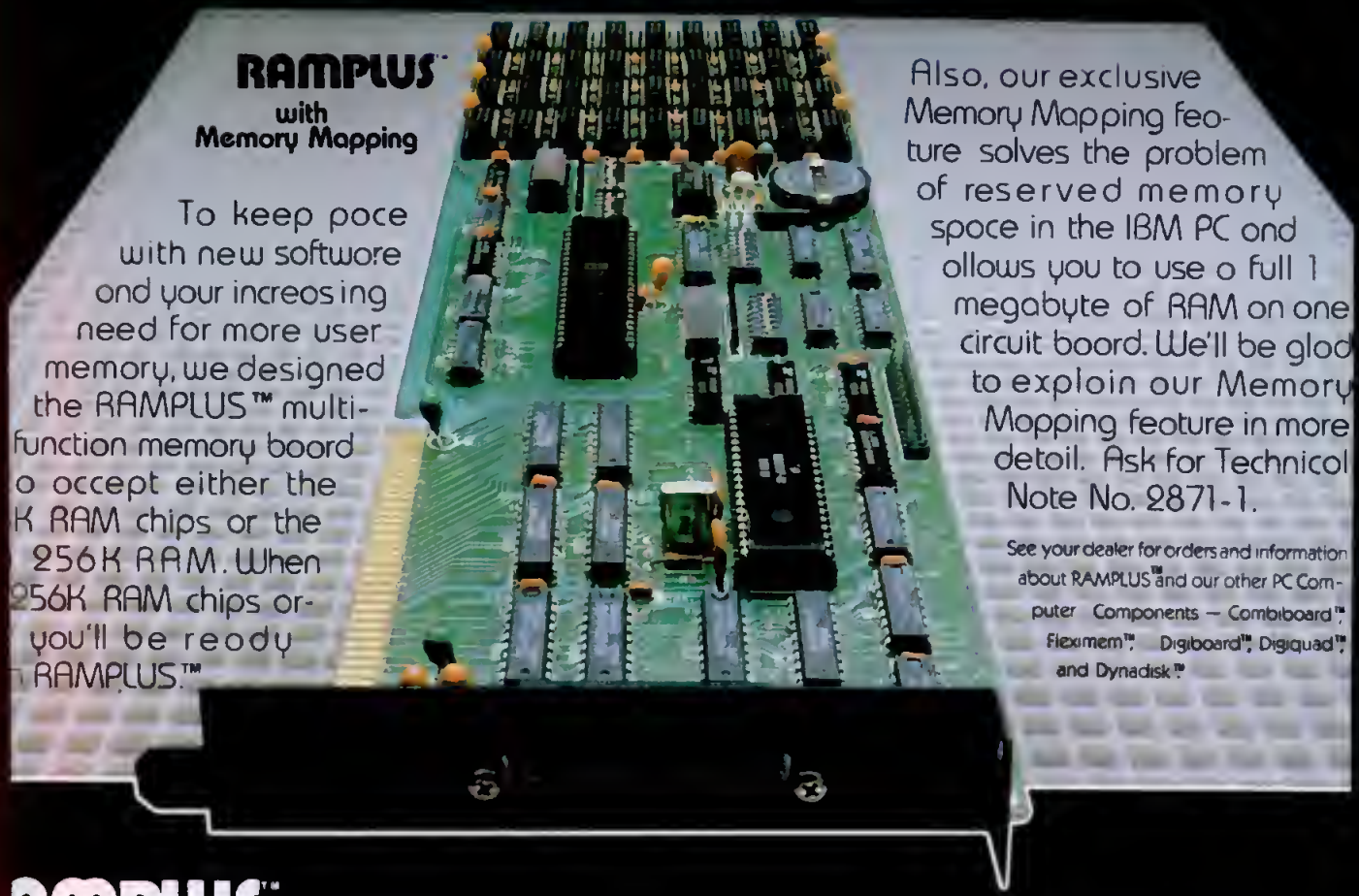

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CIRCLE 431 ON READER SERVICE CARD

PRINTING/MARK ZACHMANN

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CIRCLE 586 ON READER SERVICE CARD

TypeFoces is designed to enhance the features of e dot matrix printer. It prints larger-then-normel charecters in a variety of type feces on meny Epson (IBM) or Integral Data Systems printers. The output can be used for letterheads or signs, or can be photo-reduced to echieve e near letter-quality effect.

TYPEFACES often allows you to substitute a dot matrix printer for letter-quality printer.

Features

TypeFoces works with an Epson MX-80 or MX-100 with Greftrax, or en IDS 460/560 or prism printer. By using dot addresseble graphics, it will print text in up to 15 different styles, lncluding Romen, Italic, Script, Greek, English Gothic, and graphics fonts, (see Figures 1 and 2). The Romen, Itelic end Greek fonts come ln two sizes, end e variety of types (called simplex end complex).

TypeFoces reeds special dot commends on lines beginning with periods. It provides many of the features used by text formatters, end cen begin new peges; center lines; set up headers and footers; justlfy, fill, end start paregrephs. Also included are hendy commends to set the interline specing in smell increments and to set the distance between an underline bar end the characters on the line.

Text is proportionelly speced eutomatically. This means thet e skinny letter like i uses less room then e fet letter like m, resulting ln e visually-pleasing pege. When coupled with a standard text editor, end photo-reduction, TypeFoces often allows you to substltute e dot matrix printer for e letter-quelity printer, and echieve feetures unobteineble on most letter-quelity printers. The result, while not quite letter quelity, is good enough for business correspondence and all but the most demanding printing jobs.

While the program is running, the screen displeys the text file being printe This mekes it eesy to follow along to sp mistekes in the text file.

THE ONE desirable feature missing is the ability t mix type faces.

Perheps the one desireble featu missing is the abillty to mix type face Each printed line cen contein only o type face. The progrem also ignores t eighth dete bit, so none of the IBM li drewing end foreign languege charecte can be printed.

The Cassette Tape

All of the products distributed Alphe Software Corporetion, lncludl TypeFoces, come with an introducto eudio cassette. You are expected to p the cessette into a tepe deck and llsten the spoken instructions while trying o the demonstretion. The cessette does n contein any more informetion than t two-pege introduction, but it ls wo

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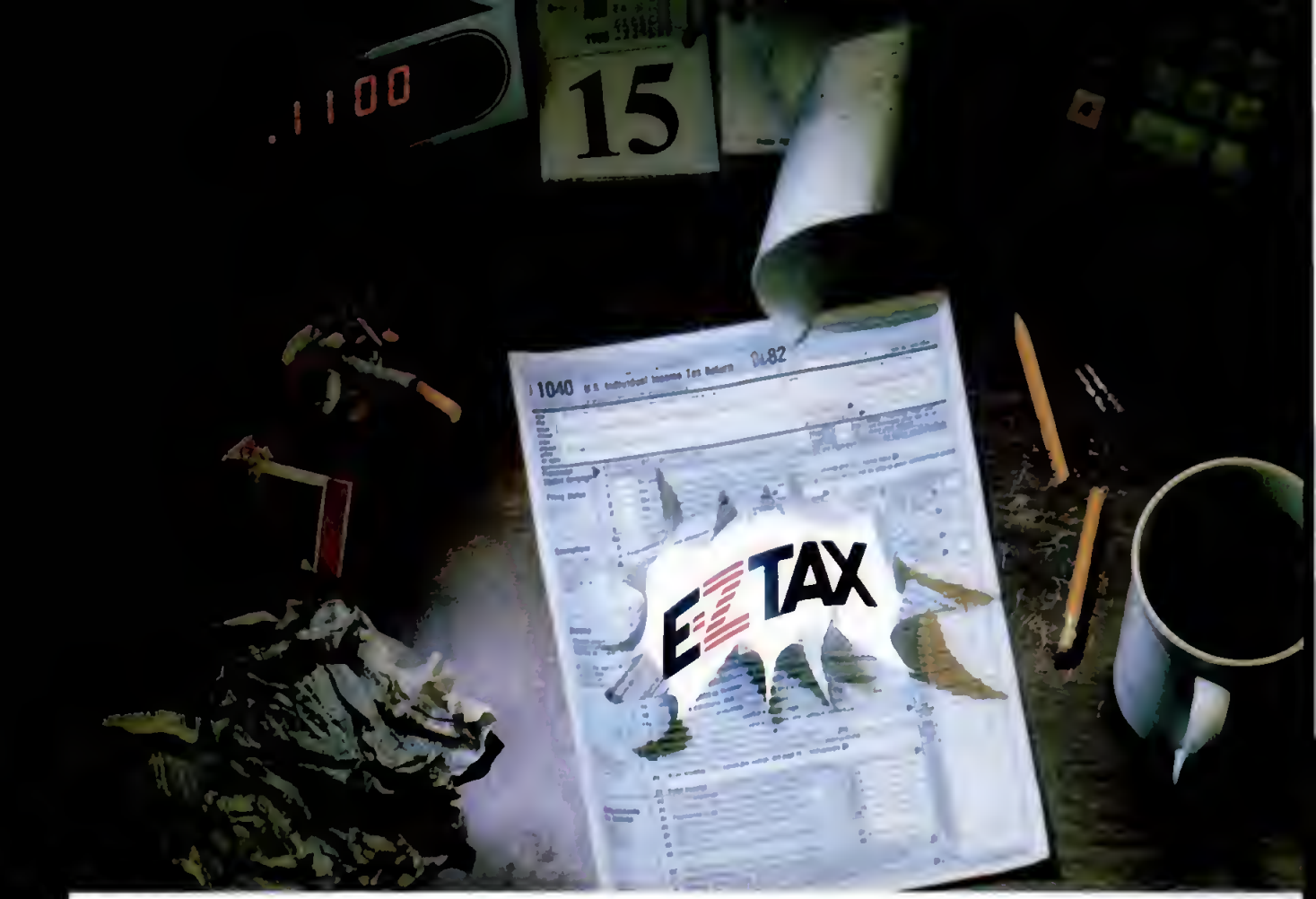

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ıg. It's lika having a knowledgeeble r standing over your shoulder helping learn.

formance

TypeFoces consists of two single-sid-lisks: e program disk and a date disk. program disk is copy-protectad and eFoces comes with a copy program tten in BASIC that lets you make up to backup copies. The backup process, vever, is slow, requiring repeatad rtion of the original and the targat k.

IF THE printer runs out of aper, or is off-line, the rogram seems to wait forever.

The program itself runs slowly. If the nter runs out of peper, or is off-line, tha gram seems to wait forever until the blem is corrected.

Still, TypeFoces works smoothly and ably on both en Epson with Graftrax en IDS printer. Tha only bug found thet text shorter than a full line was printed at all.

se of Use

TypeFoces is entirely menu-driven. questions are very explicit, and even vices should experienca no confusion. ere were not many menus, so experi-ed usars will be eble to speed through eration.

Perhaps the worst thing about Type es is the copy protection. This means t the program and the data disk are ays two distinct disks, which can ba a uine nuisence. If you edit text on e erate disk, then tha data disk has to be led out and the text disk insertad in middle of the program.

TypeFoces was extraordinarily simpla un. Initielly, howaver, soma of the dot mmands are e bit confusing. Figuring some of the finer points requires triel error. You'll probably hava to spend hour or so to femilierize yourself with formatting portion of tha program.

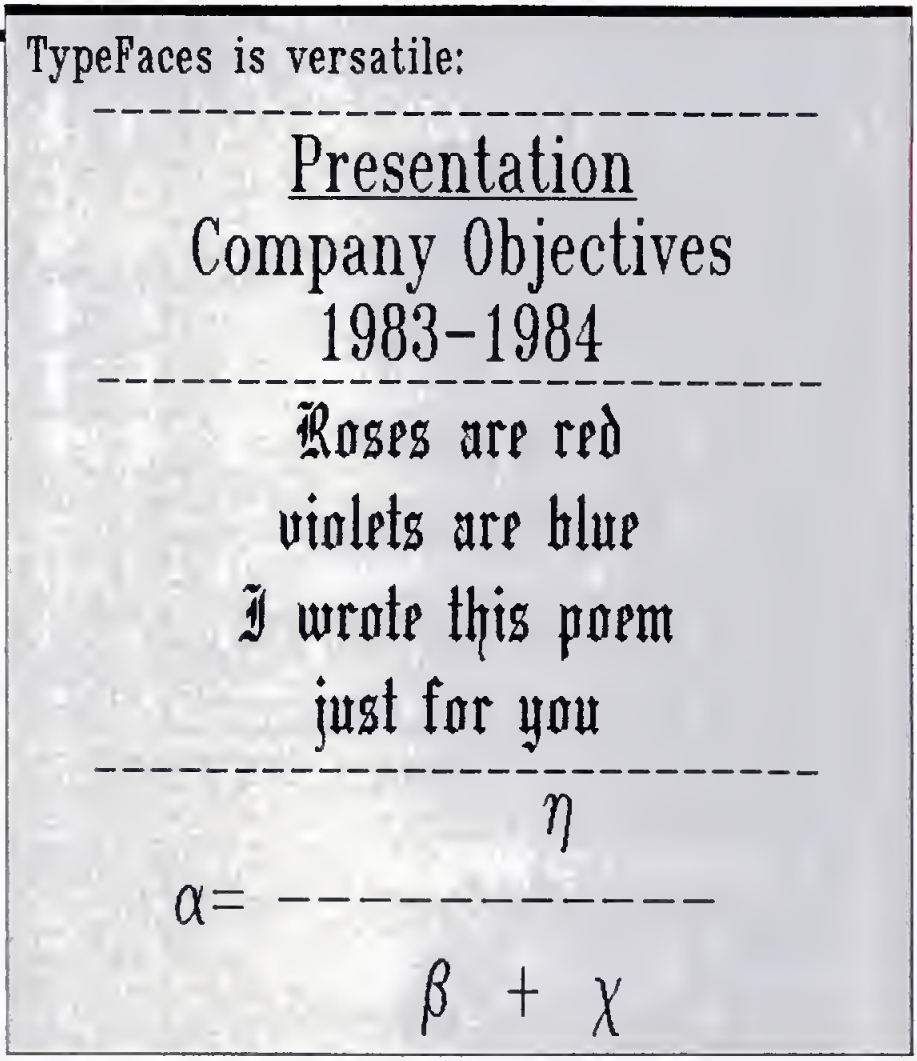

Figure 1: Somple TypeFaces output shown octuol size. Different typefoces moy be combined ond printed out together.

Documentation

The user manual is divided into sections lebeled "Before You Begin," "Introduction," "Getting Startad," "Super Easy," "Easy," and "Still Eesy." Much of the real information, such as which dot commends do whet, is relegated to e hefty appandix. The menual steps through every phese of TypeFoces, including how to copy files, erese files, use Edlin, end run Chkdsk.

For a first-time user this level of datail is helpful and welcome; for more advanced usars it may be somewhat boring. It was also difficult to saarch tha langthy tutorial to find out how to loed the disks and run the progrems.

Furthar, because much of the informetion is in appendicas, it is extremely difficult to find informetion onca you pass the novica staga. The type semples, for exemple, ere loceted in the middla of the manual. Finding the dot command summary required leafing through the full manual.

TYPEFACES fills a previously-unoccupied niche with a smooth, useful program.

There is e useful table of contents, and a not-so-useful index. For example, the lina haight commend (.lz), is indexed under "adjust line height."

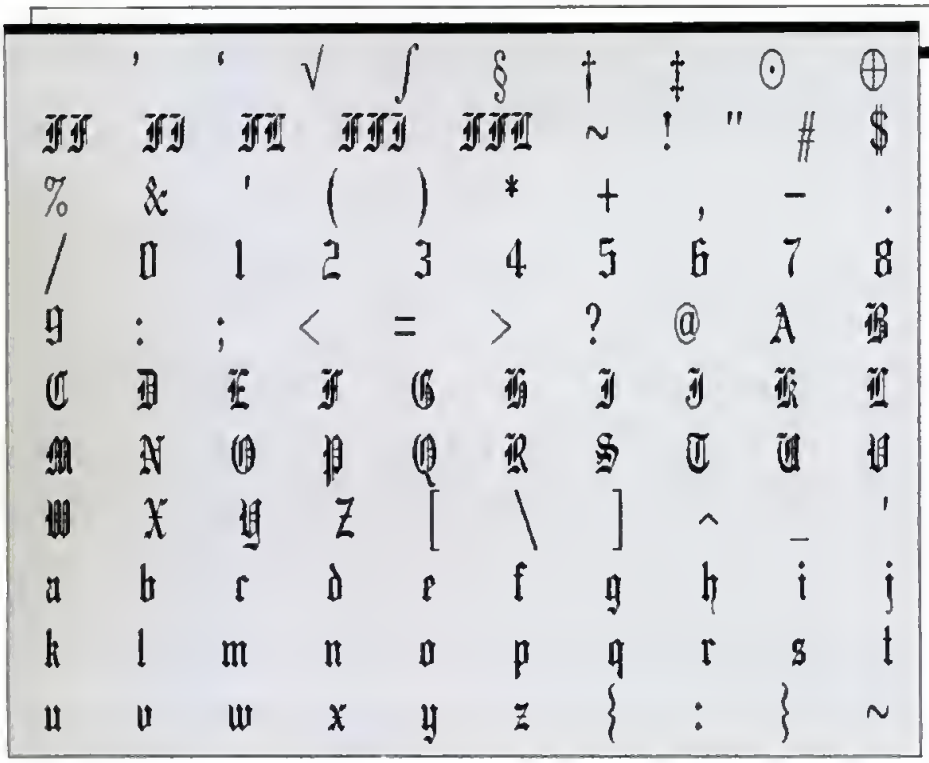

Figure 2: English Gothic character set (reduced from original size).

Error Handling

Errors caused by entering the wr
answer to menus are handled well. N
of these mistakes can cause any d
age.

The program ignores invalid dot c
mands or incorrect font selection.

TypeFaces fills a previously-unoc
pied niche with a smooth, useful
gram. It runs a bit slowly, and the dc
mentation is lacking, but neither of th
shortcomings is particularly trou
some.

*An advanced version of TypeFaces is
in early May. It will offer 50 diffe
fonts (compared to 15 currently)
will allow users to print out character
any size up to 5 inches tall. In addit
the characters will appear onscreer
capability lacking in the version
viewed, and will print out sideways d
the page rather than across, If desi
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age will be able to update their progr
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11. Summary Vendor Account Report

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PR	400 Employees	—	—	—

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CIRCLE 432 ON READER SERVICE CARD

APPLICATIONS/HAL GLATZER

The PC breaks into show business with Ibis, a program that helps talent agents bring Baryshnikov to Toledo or a Celtic band to New York.

The Automated Agent Helps Performers Get Gigs

What's your picture of a talant agant? Is it a swaaty man chomping a cigar while he swaat-talks a deal on the telephona? Is it a small-town arts administrator, searching through index cards, trying to promote her favorite folksingar into a big-city music fastival? Or is it the managar of a band, trying to remamber who it was that came backstage last night offering them another job?

The common thread in talent management is information-procassing: knowing who's playing whare, when, and for how much. Parsonal attention and endless hours on tha phona give successful managars an edge, because they can parlay that information into signed contracts. Since so much of tha business dapands on managing knowledge, not just performers, automation via computers was inevitable. Now, one agent has teamad up with a programmer to create a vertical software package for the PC that is an "integrated booking information systam"—*Ibis*. It was designad for music talant agancias, but is also suitable for fashion model agancies and speakers' bureaus.

John Ullman runs the nationwide Traditional Arts Sarvicas from Portland, Oregon. Ha finds audiences for folk musicians such as Bill Monroe (tha "father" of bluegrass), Mike Seeger, Elizabeth "Libba" Cotten (who wrote "Freight Train") and a variety of black, Irish, Cajun and Celtic parformers. He said that an agent's biggest problem is knowing who to call, or write to lina up gigs, or performances.

***VERTICAL** software packages are specific to one industry or business.*

"Here's a typical problam," he explained. "Let's say someona calls me and wants Libba Cotten in Carlsbad, New Mexico, in July. That's just one gig, and it pays well, but it's months in advance; we don't want to pass it up, but we couldn't just send her thare from har home in Syracuse, New York, without some connecting datas along the way. My problam is put togathar a tour—to find every pote tial sponsor who could put her on in t Southwast in July.

"Now, before we got the computer would scratch my head and say, 'Whe are tha sponsors around Carlsbad?' or through my Rolodex file looking names and start making phona calls. B what happens? I call somebody and th say, 'No, I can't use her, but how abo so-and-so?' and right away I have to ta some tima away from what I was doing put togather a contract for anothar p formar and another gig."

Tha software Ullman helped to wr is a databasa managamant program th lets him find those potential sponso with just one pass through tha data. keying in tha catagories ha wants, Ullm makes the PC sort out those sponso whosa zip code or area code is in t Southwestern states. It will look for tho among tham who have expressed inter in folk artists like Ms. Cottan, and it m also include anyone whosa season cove tha month of July, and who can be expe ad to meet her fee. What Ullman gats i printout of mailing labels that he can sti on a promotional flyer for Ms. Cotten.

knows, when he sends those flyers out, thet the sponsors will be predisposed to considering ber.

"In the time it would teke to meke just a few phone calls," seid Ullmen, "I can send out e hundred direct-meil pieces, and be certain thet I am reeching tha right people. I can use my time for other things, and my pbone bill will be smeller. Then, when Libbe Cottan makes her tour, it will be so afficiantly schedulad thet her trevel expenses will be lower, meening more money for her."

Enter the Programmer

Since Ullman knew the music business, but not the ins end outs of progremming, he turned for help to an old friend, Robert Harpar, of Saattle, Wasbington. As Harper Business Systems, he wrote detebese softwere for meinfremes, minis and micros. "The IBM PC is e winner," seid Herper, "end thet's why wa went with it. If you count up the microcomputer menufacturers who ere going to be eround in 5 yaars, you'll drop all but ebout five—and IBM is et the top of the list of survivors. Since very few arts managers or telent egents heve gone out and bought othar computers so fer, they might as well buy a PC when they're reedy to eutomete, end we heve the software to let them do it."

Ibis, es they developed it, became a moduler softwere peckege, with one pert dedicated to sponsor informetion end meiling list menegement, end e second part for contrect-writing end artist information.

Eacb pege of sponsor dete holds up to 28 cetegories (whet dete base menegement system progremmers call "fields"), including not only the sponsor's name, eddress, and phone number, but the size of the performence hall, eveilability of housing neerby, the kinds of music the sponsor sponsors, end room for the agent's remerks. A sample sponsor record is reproduced in Figure 1. There is elso e menu-driven process for creeting new categories.

Usars select fields, and change thair "values," by entering new deta on e line et the bottom of each pege. Harper simplified the process, for novices. "I decided not to use the cursor-movement keys," he seid, "but rether to beve the user type the first two letters of each desired field—for exemple, AD for eddress and 1R for first Remark line. While thet may not the most efficlent wey to enter leng fields, like remarks, it's perfect for short fields, like phone numbers, and eny case, it's consistent throughout program. Remember, these people are ent egents, or performers setting up th own gigs—not computer professional

The contrect and artist informet module uses the same menu-driven p cedure. Harper seid, "The egent can eta or update e performer's schedule, ete or meke chenges in e contract, keep treck of important arrangeme such es who to call on arrival."

Horizontal and Vertical Software Packages

Something for everybody or everything for somebody?

The expressions "horizontal" and "vertical" mey be most familier from the diels on TV sets, but they elso refer to softwere packages. Spreedsbeet simuletion, general ledger, accounts peyable or recaivabla, and word processing programs are horizontal: they serve the same need in every business, ecross the board.

Verticel software peckages, however, are specific to one industry or business, and handle a whole range of tesks that the particuler business performs. In the resteurant trade, for example, the software thet links electronic cesb registers to e centrel computer will record seles end update the inventory every dey; it could also bendle employee payrolls, end even mix drinks et the bar!

Vertical packages are more likely to demonstreted et trede shows for industry they heve tergeted, such as fo service, then et "computer" or "off eutometion" shows.

Horizontel software can be sold t veriety of customers, spreading the cos development over e wider bese of e users, which reduces the peckege's pr per unit. Vertical software must be craf with e singla business—or e generic ca gory including that business—in mind probebly will be expensive to buy, co pered with e horizontel product, because it does not heve to be custo tailored for eech client, it mey cost les the long run. —*H*

Figure 1: A screen produced by Ibis thot displays informotion on Concerthall Productions, a hypothetical sponsor of a concert serie at Madison Square Garden.

```
                ENTER NEW SPONSOR DATA      DELETE N                    FILEDATE 12-13-82
SPONSOR#   160                                     SEASON
   INDEX CONCERTHALL PRODUCTIONS             BEGINS  1                  MAILINGS 000
 ORGNAME Concerthall Productions               ENDS 12                  LIST ACUCAA
DIVISION Classical Artists Series              HALL Madison Sq.         SPECIAL INTERESTS
 ADDRESS 5500 Broadway Ave.                  SEATS 20000                1INT ALL
    CITY New York                            HIGH$ 150000               2INT
   STATE NY ZIP 10101                      HOUSING N                    CONTRACT RECAP
    ATTN Mr. Connoisseur                      AREA 201                NUMBER 000
 1REMARK Mr. C. likes only                     TEL 999-9999 X9999      TOTVAL 0000000
 2REMARK World-Class artists. 3REMARK                                    LAST
                                                                         PERF 00-00-00
FIELD?                                  (JUST HIT RETURN IF NO FIELDS ARE TO BE UPDATED
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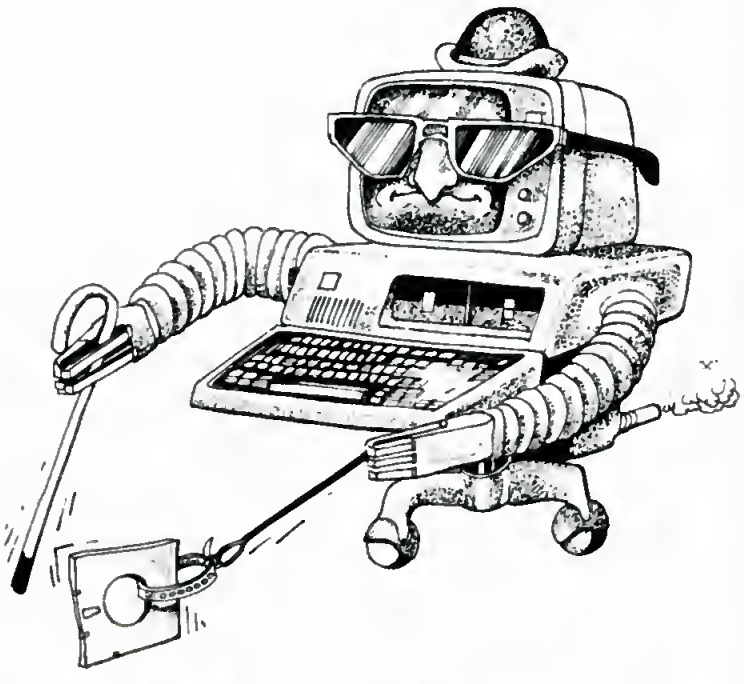

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CIRCLE 481 ON READER SERVICE CARD

The Value of Teamwork

Harper and Ullman teamed up because each had a skill to share. "Ours is a partnership between a person who knows the working part of the real market and a person who understands how to program whatever that market needs," said Ullman. "It's a paradigm for how small-business software should be designed."

THE SOFTWARE finds potential sponsors with just one pass through the data.

The system they unveiled to 125 agencies at the Western Alliance of Administrators, in Seattle last September, costs about $8,000. Included in the package are a PC with two disk drives and a printer for about $5,000; and the *Ibis* software at a price of $3,000. Ullman says, "*Ibis* can help generate $10-15,000 a year in income or savings, from an investment of under $10,000, and should pay for itself in a year."

Currently, the only shortcoming of *Ibis* is the limited storage on IBM's disks. Ullman indexes sponsors alphabetically and needs about 12 disks—one for each two initial letters. To make a geographic search, such as the Carlsbad example, he has to insert every disk by hand. Still, it's much faster than any manual search has ever been. When the price of hard disks comes down a bit, he expects to upgrade his system, and he anticipates that others will also put their files on Winchesters.

To people in the business, he says, "The things *Ibis* does are the core of what an arts agency does. It reduces paperwork and cuts way down on office overhead, enforces sound business practices, which are not always done, because they require a large staff to do them by hand. And it makes possible a lot of extras that, until now, could only be done by larger agencies, such as making multiple copies of itineraries, so everybody who needs one can get one.

"A neat trick is, when you're printing copies of the itinerary, you can put in

ave out certain information. Tha par-
rmers need averything, ell on one
ge." says Ullmen, "but the sponsor
ould not see what fees other sponsors
that tour are paying; tha local publicity
rson needs only the days and dates for
at particular city."

The markatplace for *Ibis* is limited to
ly those agencies who purchase IBM
Cs, but Ullmen has found that few agen-

ULLMAN HAS found that few agencies, except the very largest, have already bought any microcomputer at all.

es, except the very largast, heve elready
ught any microcomputer at all. Those
at hava, he says, have paid many thou-
nds of dollars for custom programs, or
r adepting DBMS end accounting peck-
es to their neads. The majority of small-
egencias, or bands who book tham-
lves, told him that they had considered
ying e micro. Now thet a vertically-
tegrated packaga is aveileble, Ullman
lieves thet those who ara raady to euto-
ate will do so.

"It's basicelly e virgin markat," he
id. "Agencies and artists—either as
dividuals or in cooperetives—can
ake use of them right away. Only a few
the people I talked to are 'technopho-
c.' Meybe about ten percent will not put
computer in their offica. Tha rest say
ey're interestad. A PC with *Ibis* will cost
out as much es a modest-priced car, but
e egency gains it back in sevings by not
ring pert-timers to type meiling labels
contracts. That cost ma $4,000–5,000
st year alone. The artists gain, too,
cause the agent gets more tima to give
em more parsonel attention.

"Speed is cruciel. Whan I finish talk-
g with a sponsor and I ask, 'Is that date
m?' and he says 'Yes,' then es soon as I
t off the phone, I went to hit the PRINT
tton and get the contract in tha mail
ght eway. Thara's no egent in tha world
no doesn't recognize thot need!" */PC*

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COMMUNICATIONS/MARK ZACHMANN

PCs can now be used to create Ethernet networks. The installation of one of the earliest is described first-hand by a pioneering consultant.

Let There Be Ethernet!

Recently I had the good fortune to install one of the first IBM PC Ethernet networks, for the Independent Bankers Association of Georgia. Microcomputer networking is becoming common, but the number of network systems now available is almost equal to the number of large companies that have considered using networks. The confusion resulting from this lack of standards has crippled everyone's efforts considerably.

One of the first available computer networks was Arcnet, which uses radio communications to connect large computers throughout the country. The most common network is, of course, AT&T's telephone system, which is accessible by modem.

Networking is a method of interconnecting multiple computers or terminals. This may be done by physically tying together every terminal/computer, or by connecting terminals to a central switching computer. Some of the more complex networks can connect one terminal to another in a variety of ways. The route for connections is determined on the basis of availability, as much selects the telephone company long distance routes. When you call long distance, the actual route depends on which lines are already in use. A call from New York City to Boston might go via Los Angeles.

Networks are currently available from IBM, Digital Equipment Corporation (DEC), Wang, and Corvus. There are major differences in the kinds of networks available. The most important of these is bandwidth, which translates as the amount of information transmitted per second. A large bandwidth network, such as Wang, can transmit video signals, which are necessary for the interchange of complex real-time graphics. A medium bandwidth network, such as Ethernet, is adequate for transmitting files and programs, and non-real-time graphics. A low bandwidth network, such as RS-232, is better suited to the transmission of character data to terminals from a main computer system.

A criterion that is often as important is the physical medium used for interconnections. Some networks require coaxial cable (as in cable TV), while others require multiple wires, or glass fiber optical cable. Ethernet is convenient because it operates over coaxial cable, which is commonly available and inexpensive.

Ethernet was one of the first well-defined systems and is one of the best networks available. Much of the original design work can be credited to the Xerox Corporation, which had the foresight to realize that a low-cost network would become exceedingly important. Xerox currently operates a number of internal networks, and Ethernet installations can be found in other companies around the United States and Europe.

ETHERNET is convenient because it requires only coaxial cable.

Planning a Network

The Independent Bankers Association of Georgia (IBAG) required a system that would let each of its four employees access to the same data. The associ works with one large database made information about its member ba Each employee needs to review about the members. One employee be using the data to address letters, a second looks up phone numbers, a third updates the membership ro

ILLUSTRATION: BOB CONRAD

.G could have used either a multiuser nputer with a number of attached ter- nals, or several microcomputers acting nodes of a network, with a common d disk for the data base.

n terms of cost, the two solutions were ghly comparable. A multiuser operat- system allows more than one person se a data base at a time; the standard PC operating system, MS-DOS version 1.1., does not. The advantage of using multiple microcomputers is that expansion is simply a matter of adding another micro. Also, microcomputer software tends to be friendlier than minicomputer software. In addition, a successful network would probably make it much simpler for member banks, some of which

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CIRCLE 187 ON READER SERVICE C

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CIRCLE 343 ON READER SERVICE CARD

have fer more employees than the association, to set up networks using the same herdware. Stenderdization would greetly reduce the menpower and training required for the members.

Once IBAG made the decision to use smell microcomputers rather than a larger micro or mini-computer, it had to select a specific microcomputer end e network. The IBM PC wes a natural choice for the individuel nodes. It is probebly the most lnexpensive second generation microcomputer, end the support is outstanding, both from IBM and third-party vendors. Tbe aveileblity of such deslrable software as *VisiCalc* and Dbase II clinched it.

A MEDIUM bandwidth network, such as Ethernet, is quite adequate for transmitting files and programs.

Choosing a network was also easy. Although other companies, such as Orchid Technology and Corvus, offered network cards for the PC, technicel end support consideretions mede Ethernet e stendout. Tbe Etbernet cards are mede by 3Com Corporatlon, e compeny with much experience in the Ethernet arene (see "Ethernet Comes To The PC," *PC*, Volume 1 Number 9). Tbey produce cards for e veriety of computers, but the PC card is the first to incorporate the newest generetion of Ethernet chips, made by Seeq. Finally, Intel supports Ethernet end produces its own Ethernet chips (not yet aveileble in quantities). With the knowledge thet the PC is also composed of Intel perts, Ethernet beceme the obvious choice.

What is Ethernet?

Ethernet falls under the heeding of a CSMA/CD network. This acronym stands for Carrier Sensing Multiple Access with Collision Detection. Every node of an Ethernet system ls etteched to the seme physical wire. When e node is ready to trensmit information it first checks wire. If it finds the wire is already in ("carrier sensing"), the node waits a sh time end rechecks. If the wire ls th eveileble, the node begins transmitti Two nodes may try to transmlt simul neously. If this beppens, wben each n detects the signels' collislon, lt abort noisily, so everyone knows it. Each n then retries the connection at rand intervels to minimize the possibility locking up the system by having two tions continually colliding with each er.

The bandwidth of a standard Ether is 10M bps (10 million bits per seco wbich means that the data on e single ed disk can be trensferred in about a te of a second. With the right booting gram in ROM on each PC, tbere is no n to heve eny disk drives in the PCs for work operations. Much to our dism IBM has made it difficult to buy diski PCs. Our ettempt to purchase PCs with disks met with unwarranted suspic from IBM that we would ettempt to re the PCs after putting in our own chea drives.

Ethernet Hardware

Physically, Ethernet ls simple. Th is one interface card for each PC (cost $950, including software) connected RG-58 coaxial cebie. The PC Ether cards are restricted to e maximum t line length of 300 meters, elthough hig power drivers ere eveileble that ext this renge to 1,000 meters. The Ether protocol can eesily support 50 to computers. A significantly greater n ber of computers may be interconnec through "gateways," computers thet dedicated to connected multiple Ether lines.

3Com elso sells an EtherShare N work Server (list price $11,500) that u en Altos computer and a 10 megab hard disk for true multiple sbaring. Xe Corporation offers e number of machi thet interconnect to Ethernet, includ its well-known Ster end Alto compute Xerox will soon introduce severel n worked copiers end leser printers. ple's new Lisa microcomputer will s have Ethernet capability as well. Ether is supported by DEC, Intel, Xerox, Ung menn-Bess, end the European Compu Menufecturers Assoclation. In additi the Instltute of Electrical and Electro

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MP/M 86	Yes	—	?
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[1]For comparison purposes, typical professional configurations consist of 16-Bit 8088 Processor, 128K RAM with Parity, Dual 320K 5-inch Floppies, DMA and Interrupt Controller, Dual RS-232 Serial Ports, Centronics Parallel Port and Dumb Computer Terminal or Equivalent.

[2]Columbia Data Products also supports CP/M 80® with an optionally available Z-80 CP/M Expansion Board

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Engineers (IEEE) has standardized much of the Ethernet interface, which should facilitate future upgrade paths.

Connecting a computer into an Ethernet couldn't be simpler. The Ethernet card plugs into the PC motherboard. This card provides a coaxial T-connector at the rear of the computer. The Ethernet's coaxial line is split at the computer with one and attached to each side of tha T-connector. The whole process takas about 10 minutes. No specific lina lengths or axtra hardware are raquired. Tha computers at each end of the network have a terminating cap on the unused side of tha T. A new machine is added by pulling off the cap, connecting tha two computers, and replacing the cap on the new end machina. This connection can be made while Ethernet is running, since work will stop automatically until tha lina is capped again.

The hardware on the board takes care of all of network overhead. It handles retransmissions in case of collision and does error checking and address detection. Each card contains a 2K buffer, wbich looks lika a parallel port to tha computar, and can usa DMA (direct mamory access), much like a buffered disk controllar card. Each card has a ROM with its Etharnet address inside; there is also room for a ROM that can boot disklass PCs. Tha address is a six-digit number that uniquely identifies that Ethernet port to the rast of the network. Although in principle, each card can read everything off the net, in practice messagas are routed to specific destinations. Ethernat also allows public addrassing, whereby evary card recaives the sama messaga. This capability is also supportad by tha 3Com cards.

WHILE YOU are using someone else's disk drive or printer, no one else can use it—including the owner.

Ethernet Software

The Etharnat cards from 3Com come with a software systam, callad *EtherLink*, which handlas disk driva and printar sharing in the network. This is not as convaniant as it should be, primarily because PC-DOS was designed as a single-user systam. Essantially, in ordar to use another computer's disk drives or printer, you need to yell down the hall to its owner, who then givas you accass to his machine and tamporarily locks himsalf out from using it.

EtherLink is composad of two main modules, PCServer and Link. PCServer asks which disk and printer to share. It also asks for your name. Whan PCServer finishes running, you are locked out from your own system until you hit the Ctrl-Break keys. Until then, anyone alsa can run tha Link program to your machine and use your disk drive and your printer as his own.

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The edvantage of this rether crude method is thet disk and printer sharing is truly trensparent. Once the link is creeted you cen use the shered disk as if it were your own. All of the PC-DOS utilities, such as Diskcopy, Dir, and Erese, will work. The only difference is thet the shered disk will do the operetions. Even typing Shift-PrtSc (which copies the materiel on the PC screen to the printer) will dump the screen to the shered printer. Progrems cannot teli thet the disk or printer is physically connected to someone else's computer.

Read-Only Access

The cost of this epproech is thet while you ere using someone eise's disk drive or printer, no one else cen use it—including the owner. I am presently working on a program thet will elleviete this problem. Although the solution is rether simple, it must deal with numerous problems that cen arise from the wey PC-DOS hendles the disk directory.

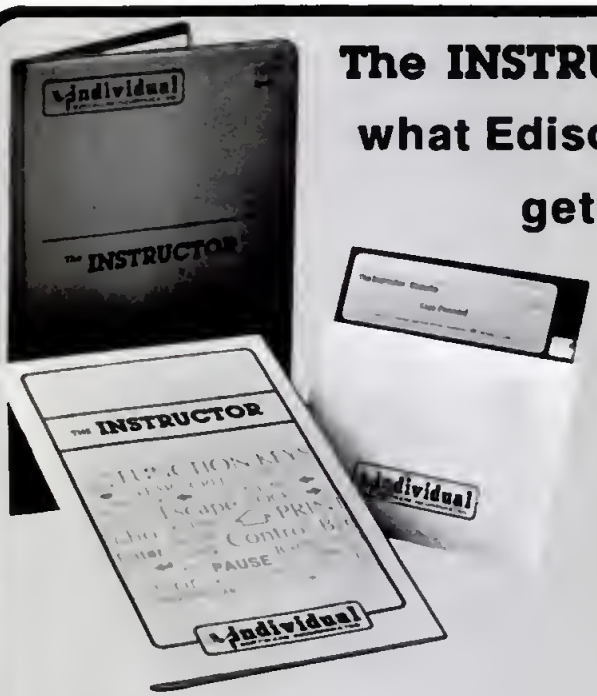
A disk directory is eesy to ruin by heving two people write to the seme disk et the same time. Giving everyone read-only access is peinless and trouble-free. Concurrent CP/M-86 or MP/M would solve the problem, but there is not yet enough good softwere eveileble for these two opereting systems. True muitiuser access may have to wait for Xenix or MS-DOS 2.0. We expect to meke reed-only eccess (with one user heving write access) feasible within the next few weeks. 3Com hes been generous with its technical dete; its employees heve been helpful; and no real problems ere expected.

ALTHOUGH IN principle, each card can read everything off the net, in practice, messages are routed to a specific destination.

The softwere thet comes with EtherLink inciudes a diegnostic program that ensures the network is working correctly. The progrem seems to work well—in fact, ell of the software seems to be very well written. The user documentetion, even in its preliminery form, is very good, and we heve yet to find e bug in the software. This bodes weil for future extensions of the network.

Conclusions

In this project for the Independent Bankers Association of Georgie, I found the physicel instellation of Ethernet to be simple. It required about 2 hours the first time, and hes since become even quicker. The net does whet we wished, although the leck of e multiuser capebility is irksome. This is not 3Com's or Ethernet's fault, but rather an inadequecy in the PC opereting system. i wish thet installing Ethernet was complex enough to require my consulting services—it reelly is almost too simple. */PC*



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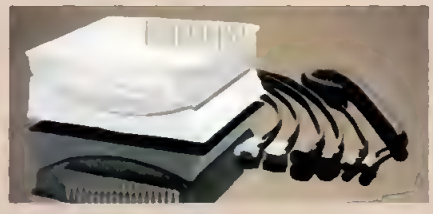

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Tips on customizing your function keys to help make program development run smoother.

No Fault Key Definitions

When you lnvoke BASIC on the IBM Personal Computer, ten function key definitions are set and displayed on the bottom line. The first few definitions are quite useful, hut some of them (such as TRON and TROFF) are rarely used. Changing the defeult key definitions greatly increeses their usefulness. The technique is general, and each user can customize the keys to his or her individuel preference.

Getting Started

First, let's exemine how to change a key definition. The KEY stetement is used to define up to 15 characters to he passed to BASIC whenever the specified key is pressed. If the lest cheracter in the definition is an ASCII 13 (represented as CHR$(13)), then the key definition is "entered" (the same as typlng those cheracters and pressing Enter). If the lest character ls not 13, then the cherecters are merely displayed on the screen et the current cursor location.

Consider these two definitions:

```
KEY 1,"LIST "
KEY 2,"RUN"+CHR$(13)
```

Pressing function key 1 (F1) ceuses LIST to appear on the screen at the current cursor location, followed by a blank. The cursor is left positioned after the hlank. The user can then type an operand for the LIST command (such as "10-100"), press Enter, end the command "List 10-100" will execute. lf key F2 is pressed, the command RUN is displeyed and executed, because the CHR$(13) is the same as pressing Enter.

MOST OF THE time, howeever, entire commands (or all but the operands) are contained in function key definitions.

If, instead of defining a command, a key is defined to be e meaningful string of characters (such as a common statement operand or expresslon), then pressing the function key could be used to add the charecters to the existing llne at the cursor locetion. For example, if we edded the following key definition to the previous definitions:

```
KEY 3,"10-100"
```

then pressing F1 followed hy F3 end Enter would be the same as entering the command LIST 10-100. This represents a legitimate and sometimes desirable use of function keys.

Undesirable Elements

Most of the time, however, entire commands (or all hut the operands) are contained ln functlon key definitions, and the fect that pressing the key adds the command to the end of the line is undesirable. Suppose, for instance, that you had started to type a command on the screen, changed your mind, and then pressed F1. The charecters LIST would appear at the end of what you had previously typed, and you would probahly get a Syntax Error when you pressed Enter. Fortunately, this prohlem can he avoided by the addition of an Escape (ESC) character at the head of the key definition. ESC ls represented in e BASIC line as CHR$(27).

When the ESC key is pressed, any text on the current line ls eresed, and the cur-

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sor is positioned at the head of the line. Thus, with the kay dafinition:

```
KEY 1,CHR$(27)+"LIST "
```

the current lina is cleared before tha LIST command is entered. One slight problem is that in tha display of tha key dafinition on line 25 of tha screen, the CHR$(27), appears as a left-arrow, the same charactar that shows up for CHR$(13). This problem can be aliminated by placing a representation of the true command as tha first six charactars in a key definition

WHEN THE ESC key is pressed, any text on the current line is erased.

(becausa tha first six charactars of tha key dafinition are always displayed at the bottom of the screen), followed by the CHR$(27) and the command that is actually to be executed. Here is an example:

```
KEY 1,"LIST "+CHR$(27)+"LIST "
```

Here the characters LIST are displayad at the bottom of the screen, but tha actual axecution saquence is:

1. Display "LIST " at the current cursor position
2. Clear the current lina (including tha just-displayed "LIST ")
3. Display tha command "LIST "

Clearing the Screen

Many users will find it desirable to clear the screen prior to executing various commands. LIST is a good candidate; RUN is anothar. CLS clears the screen, but because of the 15 character limit on key dafinitions—combinad with the desire to show tha correct command at tha bottom of the screen—it usually cannot be used. For example, to combine CLS with LIST and still show tha correct command, you would have to enter: KEY 1,"LIST " + CHR$(27)+"CLS"+CHR$(13)+"LIST ", which is 16 characters. Fortunately, there is a way to accomplish tha claaring oparation effectivaly. By using CHR$(12)

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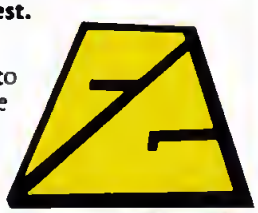

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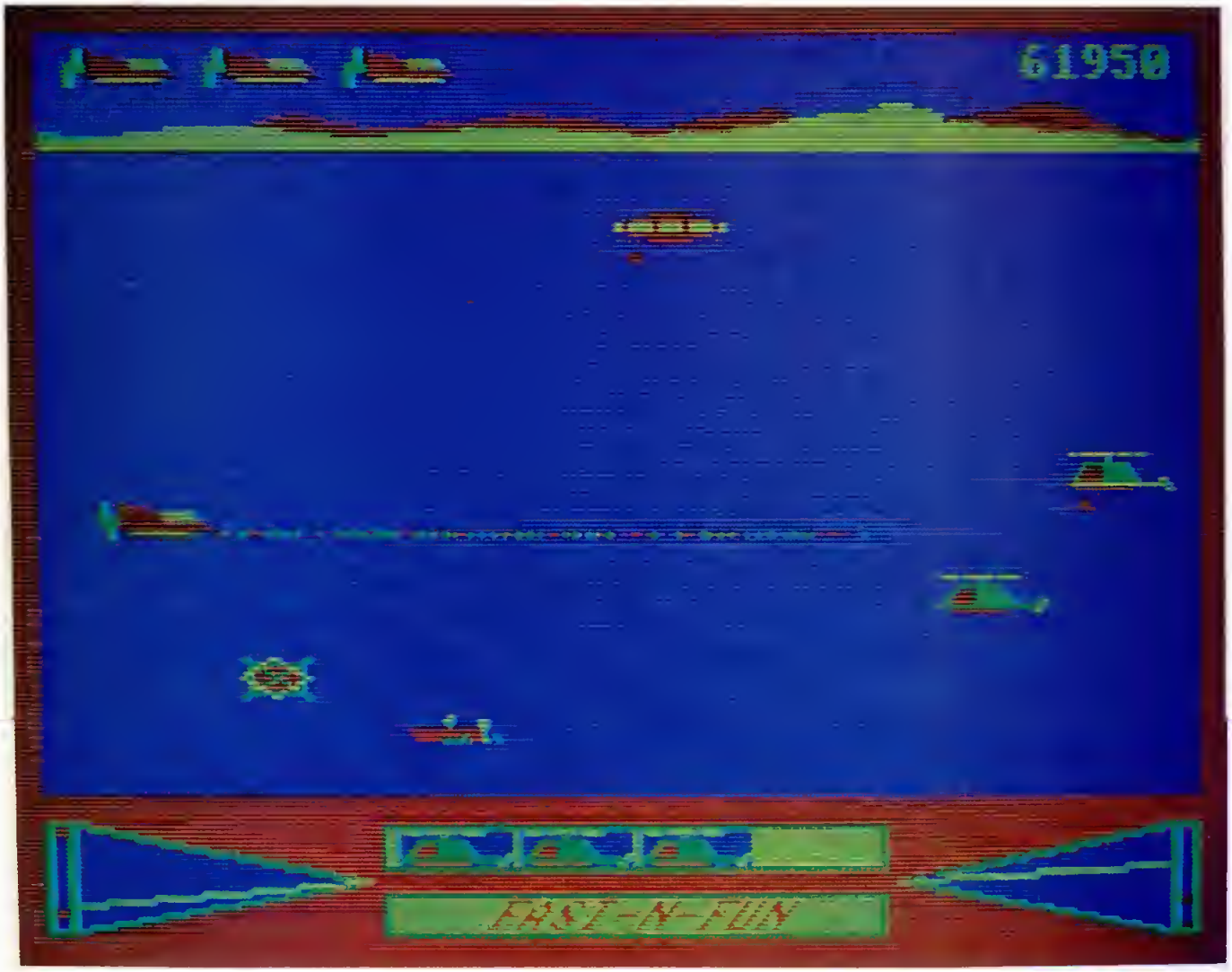

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insteed of CLS to clear the screen, the ESC (CHR$(27)) and CLS functions ere effectively combined.

The Program

The following is a portion of the program I use to set function key definitions:

```
10 SAVE "PFKS
20 KEY 1,"LIST  "+CHR$(12)+
   "LIST "
30 KEY 2,"RUN"+CHR$(27)+"  "
   +CHR$(12)+"RUN"+CHR$(13)
40 KEY 3,"LOAD"+CHR$(34)+"  "
   +CHR$(27)+"LOAD"+CHR$(34)
50 KEY 8,"LPRINT CHR$(12)"
60 KEY 9,"EDIT "+CHR$(27)
   +"EDIT "
70 KEY 10,"CLS"+CHR$(27)+"  "
   +CHR$(12)
80 KEY ON
90 NEW
```

Here is a detailed explenetion of lines 10-70:

• Line 10: The SAVE makes sure thet this program is autometicelly seved when you first run it. Otherwise, the NEW in line 90 would erase the entire progrem, unless you remembered to put it on your disk. You mey want to remove this line after you've saved the program the first time.

• LINE 20: The "LIST " represents the six cherecters to be displayed on line 25 of your screen. The CHR$(12) clears the screen (including the "LIST " just placed on the line). The final "LIST " puts the real command you want on the line, starting in column 1 of line 1. The cursor appears in column 6, efter the blank, awaiting an operand (such es 100-200), before you press Enter to execute the command. Pressing key 1 followed immediately by Enter is the seme as entering LIST by itself. If you do not went to clear the screen prior to issuing the list, then replace CHR$(12) with CHR$(27), to clear only the line the cursor is currently on.

• LINE 30: The first six characters of this line appear es the key definition on line 25 of your screen. They are "RUN", plus e left-arrow (the visuel representetion of CHR$(27), which is elso the representetion for Enter), plus two blenks. The ectual execution sequence is as follows: plece "RUN" on the current line, clear the line (because of CHR$(27)), place " " on the line, cleer the screen (CHR$(12)), plece "RUN" on the top line, and execute the RUN (because the CHR$(13) is the equivalent of Enter).

• LINE 40: The first six characters again go on line 25 of your screen: "LOAD", e double-quote (CHR$(34)), end e blank. The CHR$(27) clears the line, and the same sequence is again pleced on the line, minus the trailing blank. The cursor is positioned right after the quote, ready for the user to complete the line.

• LINE 50: Here the CHR$(12) is pert of the text of the line — a request to "form feed" the printer. Because the complete text is 15 charecters long, there is no room for a leading CHR$(27) to clear the current line.

This line also points out a coincidental problem of using CHR$(12)—its duel function of clearing the screen or form feeding the printer. It may be apparent that the CHR$(12) could be included et the head of e command to clear the screen and then execute the following command, without going to the trouble of coding the command followed by blanks, etc. This works fine (with the CHR$(12) showing up on line 25 of your screen es the biological symbol for e female)—until you do e Prtsc (print screen). When line 25 is printed, each CHR$(12) form feeds the printer.

• LINE 60: This line is perhaps the simplest end most typical use of e key definition: the commend (with blank padding to six cheracters), the ESC character, and the command again (followed either by a blank, if operands are optionel, or CHR$(13) to execute).

• LINE 70: The first six characters represent the commend egein: CLS, en ENTER arrow, and 2 blanks. The CHR$(27) clears the line, the two blenks ere put on the line, end then the screen is cleared. The

MANY USERS will find it desirable to clear the screen prior to executing various commands.

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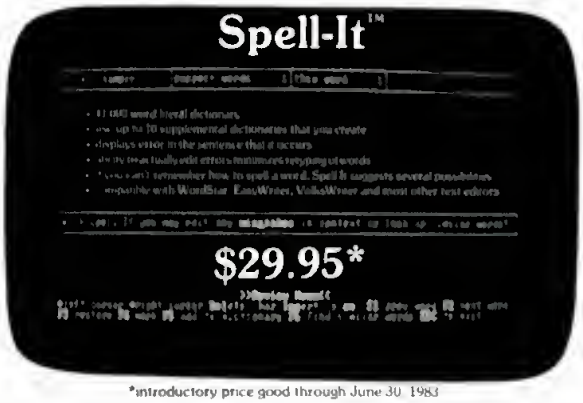

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CIRCLE 256 ON READER SERVICE CARD

cursor ends up on line 1, position 1.

Note thet the command CLS is not ectually executed. It could have been used instead of CHR$(12), but then "OK" would heve been displayed on the top line, with the cursor on the second line.

FORTUNATELY, there is a way to accomplish the clearing operation effectively.

This points out thet the command displeyed on line 25 of your screen does not heve to be whet is actuelly executed.

Other Functions

There are other powerful CHR$(n) functions thet can be used in KEY definitions. See the User-to-User column in Volume 1 Number 6 of PC. One final note: I heve e BAT file called B.BAT which I use in DOS to invoke BASICA with my key definitions. When I boot up DOS, all I heve to do is hit B then Enter and the PC loeds BASICA end sets the function keys automatically. (See the DOS manual on how to set up such batch files.) B.BAT is one-line long:

```
BASICA PFKS
```

I end the line with ASCII 26 (entered by holding down the ALT key and pressing 026), to ceuse the BAT processor not to come back to B to read enother line after ending BASICA (that eliminetes an unnecessary "A>" prompt). When I type B, BASICA is invoked; and program PFKS (my function key definitions) is run.

Note thet the PFKS program ends with the two commands KEY ON, to displey the key definitions on line 25; and NEW, to clear out the PFKS program, leaving en empty work spece. The response from running B is "OK" et the top of the screen and my customized function key definitions on the bottom line. Obviously, e PRINT stetement could be edded before stetement 90 to present a customized message aheed of "OK". Happy customizing! */PC*

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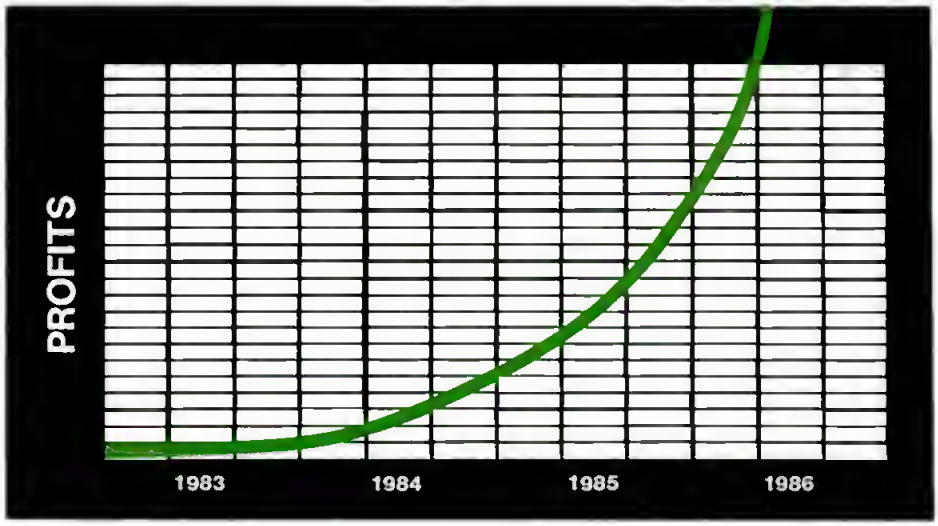

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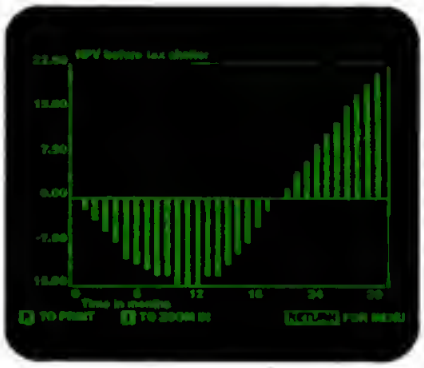

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LANGUAGES/FRED BRACK

Manipulating character strings in BASIC requires a review of the language and an understanding of how it responds to your commands.

The Fundamentals Of BASIC

Programmers frequently must work with data mada up of charactars rather than numbers. Thare are ovar e dozen statements and functions in BASIC to process such charectar data.

In BASIC, character data is referred to as string data—a string of characters enclosed within double quotation marks ("ABC"). Strings can contain any amount or type of characters (alphabetic, numeric, special symbols). Strings ere diffarentiated from numaric deta, which does not appear within quotas, and which can contain only numbers and an optional sign (123. or −5). It is important to understand the difference between the number 123 and the string "123". The number can be manipulated arithmetically (multiplied, subtrectad, atc.) by BASIC statamants, but the string cannot.

BASIC always knows what kind of data to axpect in a given variabla by the default, defined, or explicit dafinition of the varieble name. By default, all variabla names are considered to be single-precision numbers. Most people put a "DEFINT A-Z" statement at the start of their program to re-dafina all variablas as Integers. If a varieble is not to be treated as either the default or redefined type, then it can be explicitly defined by making the last charecter of tha variable name a $ (for string), or a %, !, or # (for integer-, single-, or double-precision numeric).

BASIC always knows what kind of data to expect in a given variable name.

In this articla (and elmost elweys in practice), charactar variebles will ba defined explicitly, by a name that ends in e $. Thus, the statament I=A$+1 will causa a TYPE MISMATCH error in BASIC, becausa BASIC knows that A$ is character data and cannot participata in arithmetic operetions. In fect, tha statamant I=A$ is also invalid, beceuse e string velua cannot be directly assigned to an Integer variabla, even if tha string is composed only of numbers.

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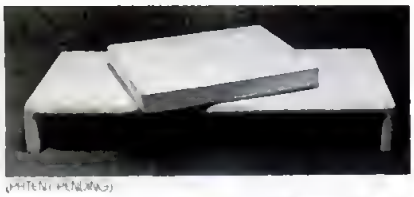

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Converting Variables

It is often necessary to convert an integer to a character velue end vice versa. BASIC provides two statements that are essentielly opposites: STR$, which converts e numeric value to a string; and VAL, which converts a string to a numeric value.

STRINGS are differentiated from numeric data, which does not appear within quotes, and which can contain only numbers.

Let's look at the examples mentioned earlier: I=A$, and the reverse, A$=I, both of which cause TYPE MISMATCH errors. Looking at the second case first—creating a character string out of a numeric value—we use the STR$ function as follows:

```
A$=STR$(I)
```

Now assume thet the value of I is 100. After executing this stetement, the variable A$ contains the string " 100". Note the leading blank. STR$ reserves that space for the erithmetic sign, in case the number is negative. (PRINT does the seme thing when printing numeric values.) If the number is positive, the leading blank may be undesirable, and you may remove it.

Consider the requirement to store the result of a celculetion, RESULT, es part of a message (MESSAGE$). Using STR$, you might code:

```
MESSAGE$="The answer is "
         +STR$(RESULT)
```

Note thet e string can be created from several components by using a plus sign between the components. The first com-

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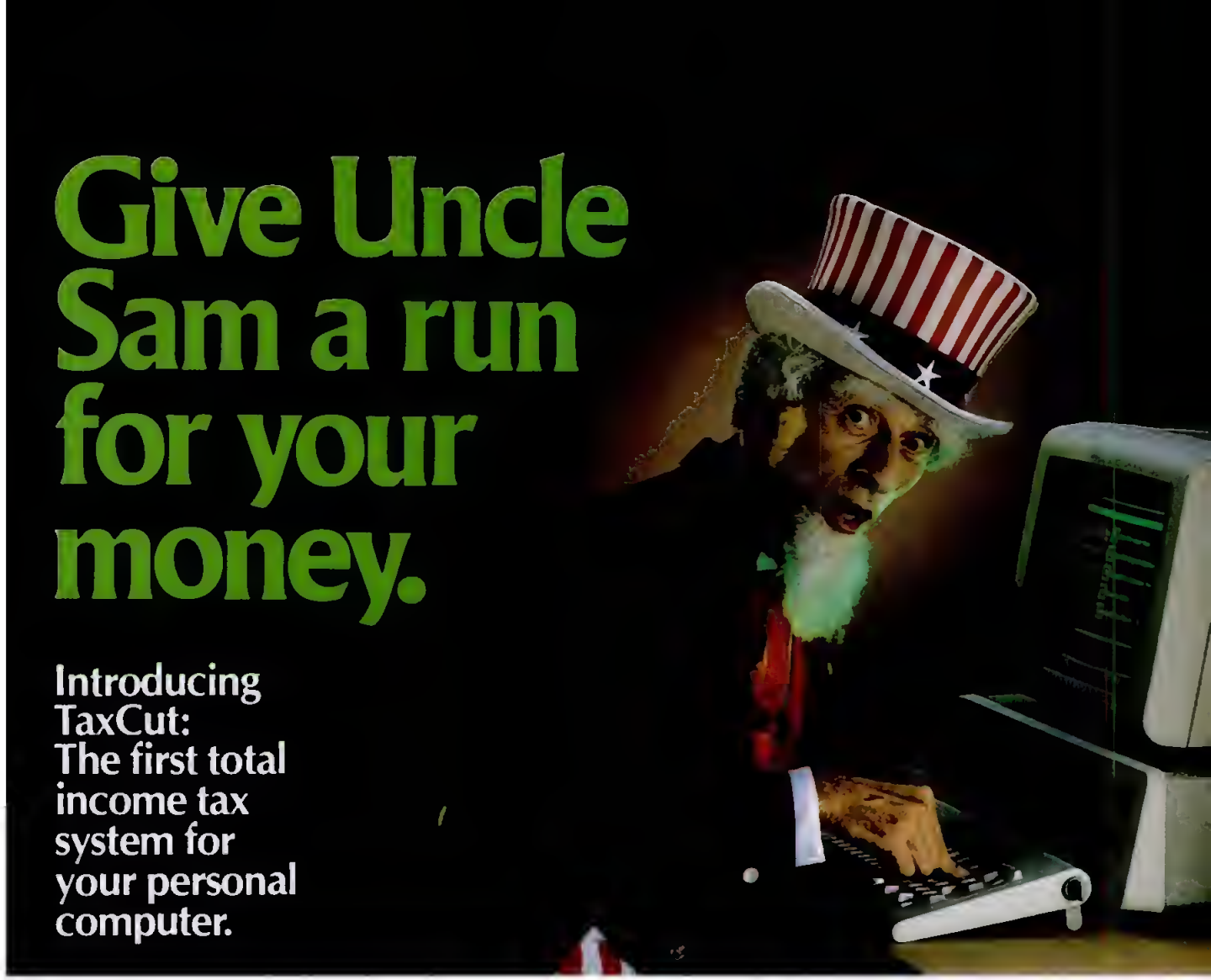

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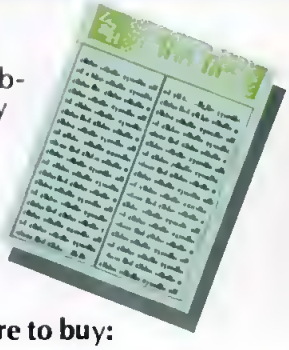

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ponent is "The answer is", and the second component is STR$(RESULT). The number that RESULT represents is converted into e string, and that string is "concateneted," or edded to "The answer is ".

Assuming that RESULT equals 100, MESSAGE$ now conteins:

```
The answer is   100
```

Note the two blenks before the "100"—one from the first string, and one as the piece-holder for the sign of the result of the STR$ operation. If RESULT had been negative 100, the second blank would heve been replaced by a minus sign, and MESSAGE$ would read:

```
The answer is -100
```

THE confusion arising from the use of VAL is one of the main reasons this article is being written!

If you are sure the result is positive, you could heve coded your original stetement es:

```
MESSAGE$="The answer is"
         +STR$(RESULT)
```

and only one blank would appear before the "100". You could also put a period at the end of the sentence by concateneting an additional string consisting of a period in quotes. With BASIC's direct mode of operation, such experimentation is easy at the terminal. You could type the following statements, varying them slightly each time:

```
RESULT=100
MESSAGE$="The answer is"
+STR$(RESULT)+"."
PRINT MESSAGE$
The answer is 100.
```

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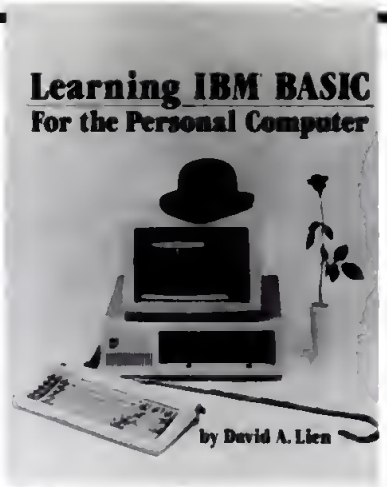

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posed the expression I=A$, and said that VAL would help us in the conversion. We would use it as follows:

```
I=VAL(A$)
```

The variable I could now be used in computations such as RESULT=5*I+10. There is one slight problem, however. VAL operates with only as much of the string as it interprets as numeric. As soon

VAL OPERATES with as much of the string as it interprets as numeric.

as it hits a character other than a number, arithmetic sign, or blank, it ignores the rest. For a totally non-numeric field, VAL returns a 0. For example:

```
I=VAL("123")     yields   123
I=VAL(" 123")    yields   123
I=VAL("123 ")    yields   123
I=VAL("-123")    yields  -123
I=VAL("ABC")     yields   0
I=VAL("A12")     yields   0
I=VAL("12C")     yields   12
```

The last example illustrates the danger in relying solely on VAL to perform conversions. Many people assume that if a non-numeric character appears anywhere in the string, that VAL will return a zero. This is not true. VAL returns a zero only when the first non-blank character it encounters is not numeric (or an sign). To validate a supposedly numeric field, examine the field character by character. Only when the field has passed the numeric test can VAL be used safely.

Another common string function is LEN, which returns the length of a given string. Here one must keep in mind that the length of a string includes *trailing blanks*. There is no simple way to remove trailing blanks in BASIC for this must be accomplished in a subroutine, looking at the string character by character.

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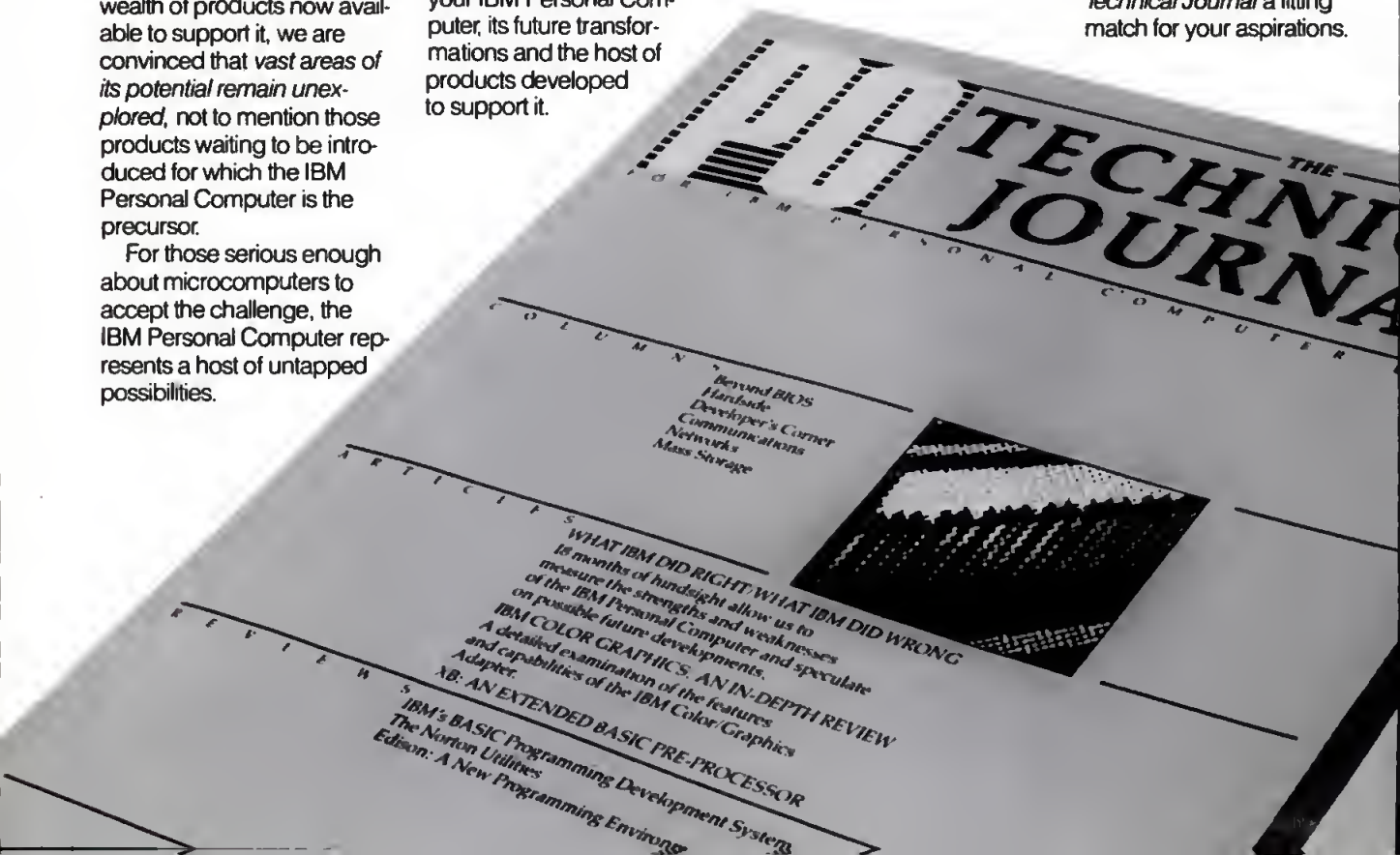

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CIRCLE 402 ON READER SERVICE CARD

```
I=LEN("ABC")          yields 3
I=LEN("123 ")         yields 4
I=LEN(MESSAGE$)       yields the
   number of characters in
   MESSAGE$
I=LEN(MESSAGE$+A$) yields
   the number of characters in
   the string formed by the
   concatenation of MESSAGE$
   and A$
```

Taking Strings Apart

A string may be broken into sections of one or more characters by using the LEFT$, RIGHT$, and/or MID$ functions. Here ere some more examples:

```
A$="THIS STRING"
B$=LEFT$(A$,4)     yields "THIS"
C$=RIGHT$(A$,6)    yields "STRINC
D$=MID$(A$,4,3)    yields "S S"
```

ONLY WHEN the field has passed the numeric test can VAL be used safely.

In the last example, the MIDdle of A$ is extrected, beginning et the 4th character, for a length of 3 charecters. When used on the right-hand side of an equation, MID$ is e "function." It can elso be used as e "statement" by moving it to the left of the equal sign. For example:

```
MID$(A$,3,2)="AT"
```

changes the value of A$ from "THIS STRING" to "THAT STRING". One very important point to observe ebout the statement form of MID$ is thet it changes e portion of an existing string, rether than defining a new one. The ectuel storage location of the string—and its length—do not chenge. MID$ on the left cannot be used to extend a string beyond its original length. On the other hend, it offers en efficient reuse of storege without alloceting additional spece for e new string, as is often done when only a variable neme appears on the left.

Sometimes it is useful to deal with the ASCII charecter set values of variebles, instead of the string notation (the ASCII

value of the letter o is 97). This is used to translate letters from upper- to lowercase and vice verse, to convert letter values to numeric offsets from 0, etc. The ASC and

CHR$ IS commonly used to send a "special" character to the screen or printer.

CHR$ functions trenslete beck and forth between ASCII and string values es follows:

```
ASC("o")  returns the ASCII
          code of the
          character "c"
ASC(A$)   returns the ASCII
          code of the
          first character of A$
CHR$(n)   returns a 1-character
          string of ASCII code n
```

CHR$ ls commonly used to send a "speciel" character (one whlch does not have a readily-available keyboard equivalent) to the screen or printer. Examples include CHR$(27), the "escape" character, and CHR$(12), a forms feed for the printer (e.g., PRINT CHR$(12)). Operetors must understend the difference between STR$ versus CHR$, and VAL versus ASC.

Here ls an example using four of the functions we heve looked at so far. To convert the value of e varieble R$ to uppercase, the following statements could be used:

```
1000  FOR I=1 TO LEN(R$)
1010  J=ASC(MID$(R$,I,1)) 'Get
      ASCII value of next char
1020  IF J<97 OR J>122 THEN
      1050 'Test if J between
      "a" and "z"
1030  J=J-32 'Yes - change value
      to uppercase
1040  MID$(R$,I,1)=CHR$(J)
      'Replace char with
      uppercase
1050  NEXT
```

Code somewhat similar to the ebove can be used for the previously mentioned numeric field velidation and/or trailing blank removal.

Combing Functions

Another useful function is INSTR—"instring"—which locetes the first occurrence of one string inside another.

```
INSTR(n,X$,Y$)
```

returns the position of the first occurrence of string Y$ in string X$, starting at position "n" ("n" is optional); it returns 0 lf Y$ is not found.

Let's look at en example of INSTR, emphasizing the possibilities of combining severel functions into one line of code. Suppose you wented to find the first blenk ln an lnput field, so you could separete out the first word for further examinetion. Since we want to start searching for the blenk—right at the start of the line—we cen leeve off the "n", defaulting to 1. If the input string were

SOMETIMES it is useful to deal in the ASCII character set values of variables, instead of the string notation.

"COMMANDS$", then you might code:

```
LOC.BLANK=INSTR(COMMAND$," ")
          'find location of
          blank
LTH.WORD=LOC.BLANK-1 'calc
         length of word before
         blank
FIRST.WORD$=LEFT$(COMMAND$,
LTH.WORD) 'extract first word
        - or you can use -
LTH.WORD=INSTR(COMMAND$,
         " ")-1
FIRST.WORD$=LEFT$(COMMAND$,
            LTH.WORD)
        - or you can use -
FIRST.WORD$=LEFT$(COMMAND$,
            INSTR(COMMAND$,"
            ")-1)
```


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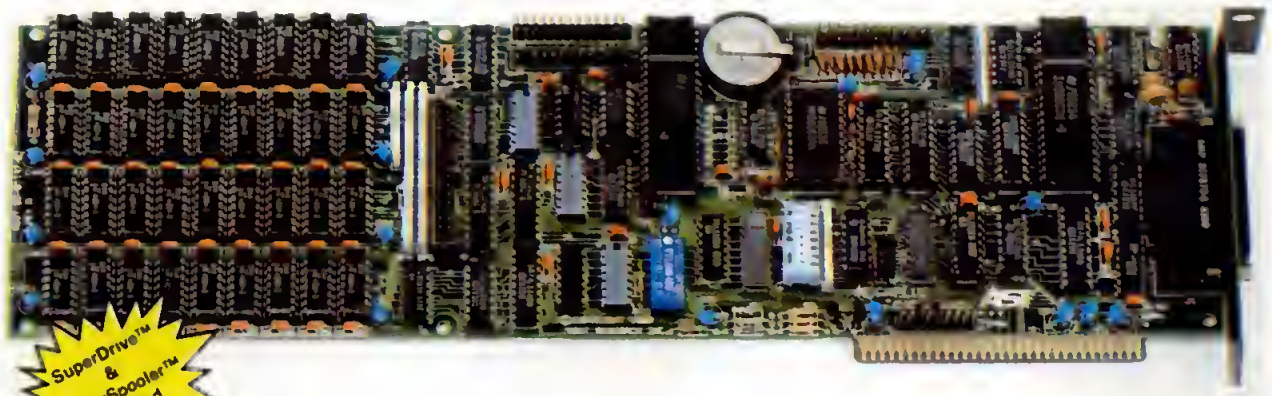

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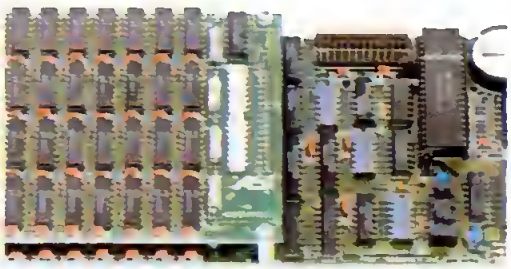

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Figure 1: Examples of character string functions and statements and the results they yield.

```
THIS STATEMENT                          RESULTS IN:
----------                              ----------
PRINT "A=";STR$(-1)                     A=-1
PRINT "A=";STR$(1)                      A=1
PRINT "A=";MID$(STR$(1),2)              A=1
PRINT "A=";RIGHT$(STR$(1),1)            A=1
PRINT "A=";RIGHT$(STR$(123),1)          A=3
PRINT "A=";MID$(STR$(123),2)            A=123
PRINT "A=";val("1")                     A=1
PRINT "A=";val(" 123")                  A= 123
PRINT "A=";val(" 1AB")                  A= 1
PRINT "A=";val(" -2-3-4")               A=-2
PRINT "A=":val(" -2 3 4")               A=-234  <== Note!

D$="821225"
PRINT MID$(D$,3,2)                      12
PRINT MID$(D$,3)                        1225
PRINT RIGHT$(D$,LEN(D$)-4)              25
PRINT MID$(D$,3,2);"/";RIGHT$(D$,2);"/";LEFT$(D$,2)
                                        12/25/82

PRINT STRING$(10,"=")                   ==========
PRINT STRING$(10,97)                    aaaaaaaaaa
PRINT STRING$(10,"ABC")                 AAAAAAAAAA
PRINT STRING$(5,"A");SPACE$(5);"B"      AAAAA     B

A$="ABCDE"
B$="BCD"
PRINT LEN(100)                          TYPE MISMATCH
PRINT LEN("100")                        3
PRINT LEN(A$+B$)                        8
PRINT ASC("A");" ";ASC(B$)              65  66
PRINT CHR$(97);CHR$(65)                 aA
PRINT INSTR(A$,"E")                     5
PRINT INSTR(A$,B$)                      2
PRINT INSTR(3,A$,B$)                    0
PRINT A$+" "+B$+STR$(LEN(A$+B$)+1)      ABCDE BCD 9
PRINT HEX$(15)                          F
```

This example is illustrative of technique only. ft is not a particularly "good" piece of code because if there were no blank in COMMAND$, then fNSTR would return a zero, and the LEFT$ function would fail. Some miscellaneous string functions are as follows:

	RETURNS A STRING OF
SPACE$(n)	"n"spaces(blanks)
STRING$(n,m)	length "n" whose characters are all ASCII code "m"
STRING$(n,"c")	length "n" whose characters are all "c"
STRING$(n,A$)	length "n" whose characters are all the same as the first character of A$
HEX$(n)	the hexadecimal value of the decimal number "n"
MKI$(n)	length 2-bytes, identical to the integer value n (not a string) - the
CVI(A$)	integer value stored in A$, previously stored by MKI$

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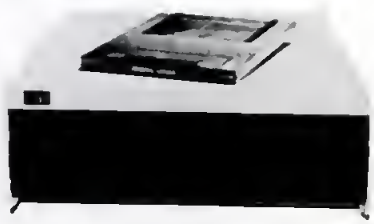

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STRING$ is useful for creating linas with repatitiva charactars in tham, such as screens with "=" signs on aithar sida of a centared title. HEX$ is useful in dumping screens when dabugging.

Switching Forms

Tha usa of MKi$ and CVi is not so obvious. Along with MKS$ and MKD$ (for singla- and double-precision values), MKI$ is used primarily in preparing intagar data for storage in a random fila buffar. Likawisa, CVi (and CVS and CVD) ara usad to axtract numaric data from the sama buffar aftar a GET oparation. However, its usa axtands bayond moving data.

One can "raad" tha name "MKI$" as "MaKa Intagar a string ($)," while CVi stands for "ConVert to Intagar." Tha functions are really usad to trick the BASiC intarpratar into allowing using numeric values whara string values are normally usad, and vice versa. Although tha tarm "convert" is used, no conversion actually takes placa.

An integer is stored in a 2-byta fiald. Whan an integer value is refarencad in tha function MKi$, that sama 2-byte fiald is moved, unmodified, into a charactar string. Tha CVI function revarses tha process, pulling two "string" characters out and interpreting them as numeric.

So what is tha valua of this informa-

STRING$ IS useful for creating lines with repetitive characters such as screens with "=" signs on either side of a centered title.

tion? Suppose you had a random file containing names and addresses. You wish to sort tha fila by last nama and print the results. First you raad avery record sequantially, saving only tha last nama in an array, which is than sortad. Now, because you didn't hava room to save tha rest of the data in the array, you need to go back and read each record again, in the sorted order. To do so, you will hava had to sava tha record number, along with tha last nama. MKI$ allows you to do this, by

AN INTEGER is stored in a 2-byte field. When an integer value is referenced in the function MKI$, that same 2-byte field is moved, unmodified, into a character string.

tacking tha racord number (an intager valua) onto the end of aach last nama string in the array, as follows:

```
1000FOR RECNUM=1 TO MAXREC
1010GET #1,RECNUM
1020ARRAY$(RECNUM)=LASTNAME$
    $+MKI$(RECNUM)
1030 NEXT
```

The LASTNAME$ fiald (defined earliar in a FIELD statemant) is transferred to ARRAY$, and its originating record number is stored with it. Tha use of MKI$ is not concarnad with tha random file buffer itself, but rathar with tha currant record number. Latar, whan the array is sortad and read back, tha record number could ba ratriaved by the statamants:

```
2000 LNAME$=LEFT$(ARRAY$(I),
     LEN(LASTNAME$)) 'Pick off
     last nama
2010 RECNUM=CVI(RIGHT$(ARRAY
     $(I),2)) 'CVI tha last two
     bytas
```

Study tha axamplas (see Figure 1) of charactar string functions and statemants, and tha results thay yield. If you really want to make sure you understand, covar up the right hand column, writing down what you think tha result will be. Usa BASiC in "diract" moda to experiment, too.

Keep in mind that a PRINT of an integer value results in a blank before—for positiva numbers—and after each intager. */PC*

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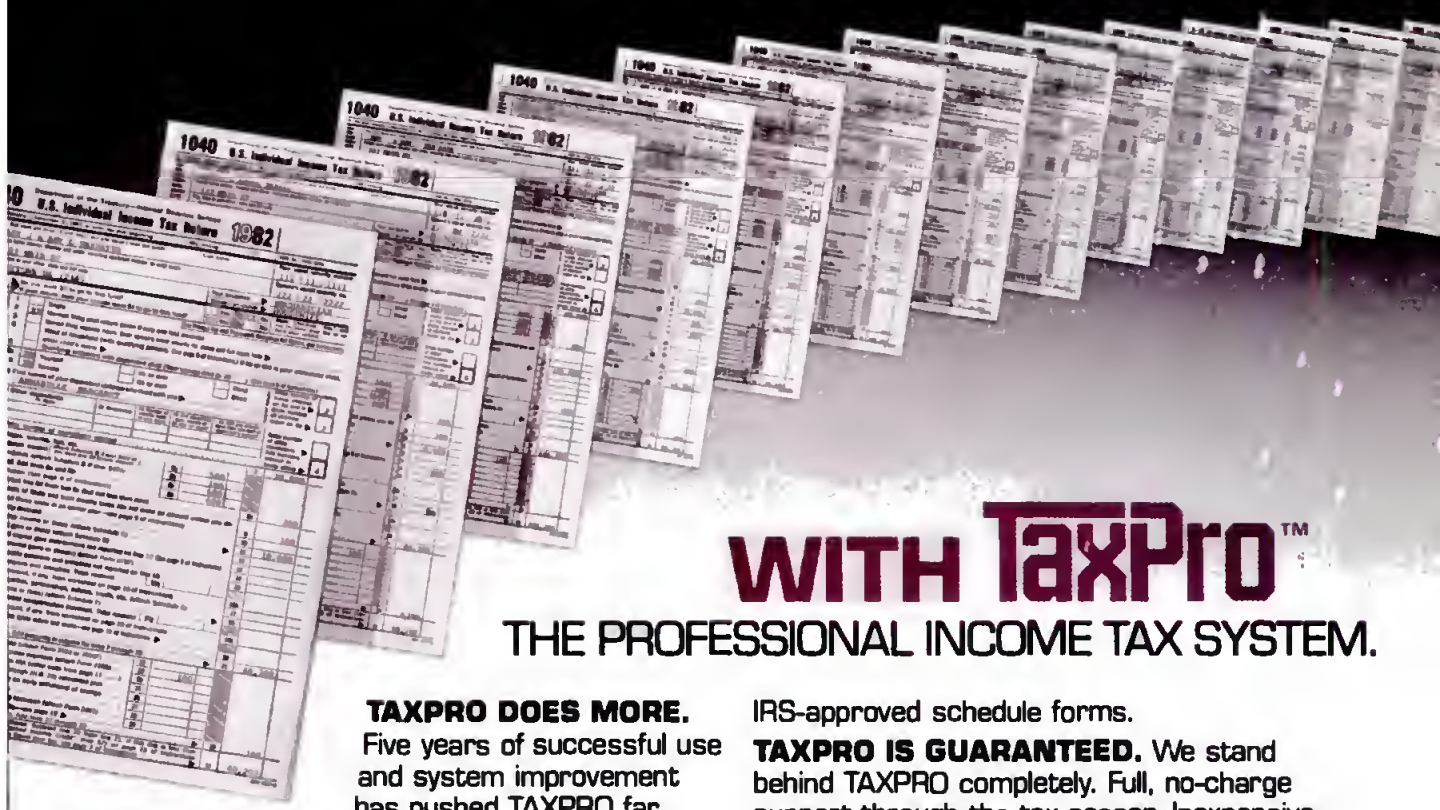

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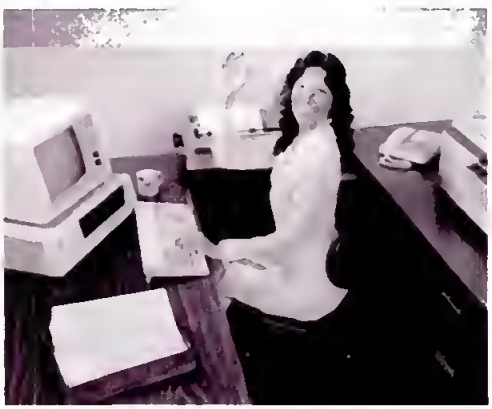

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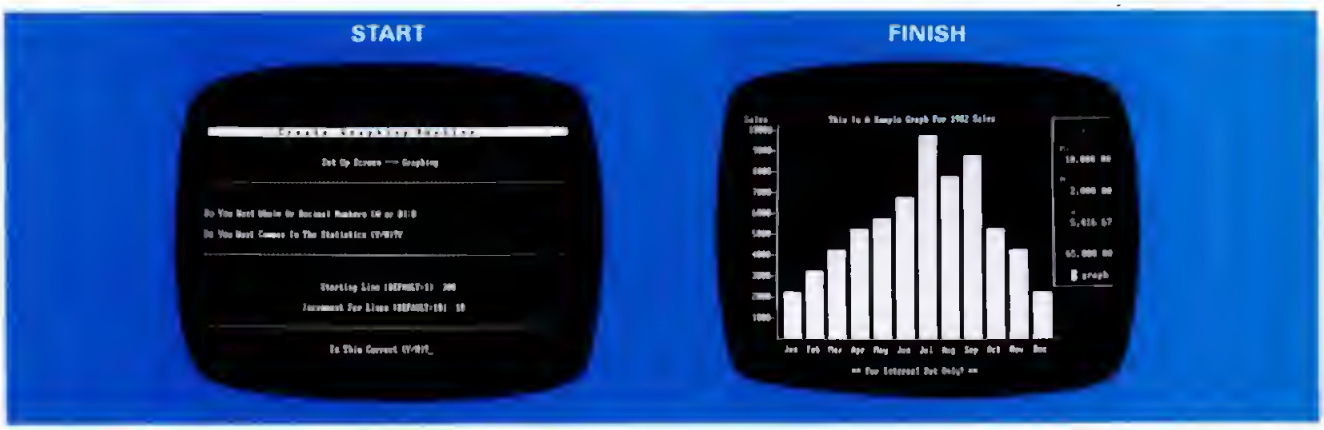

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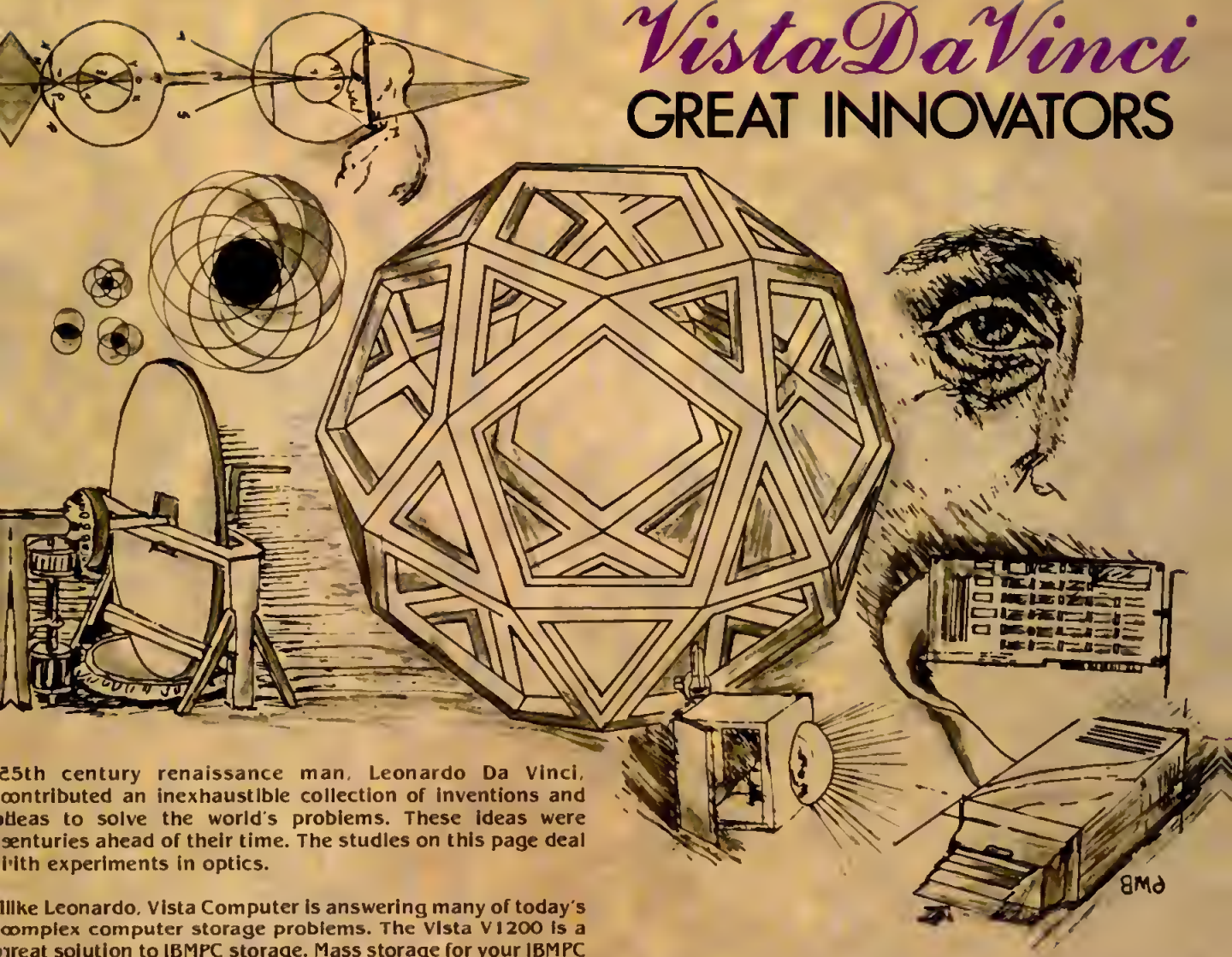

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Guess What's Coming For

Micro Cookbook
Virtual Combinatics
P.O. Box 755
Rockport, MA 01966
(617) 546-6553

List Price: $40
Requirements: 64K, at least one disk drive. Can use monochrome or color/graphics boards and displays. Printer optional.

CIRCLE 692 ON READER SERVICE CARD

Diet Monitor
Camrass Corporation
P.O. Box 118
Boonton, NJ 07005
(201) 328-8917

List Price: $69
Requirements: 64K, two disk drives, printer (IBM dot matrix or Epson recommended).

CIRCLE 693 ON READER SERVICE CARD

Presenting the ultimate menu-driven programs: In *Micro Cookbook* you feed your PC some information and it helps you prepare dinner. Then *Diet Monitor* will scold you for abusing your body.

Frankly, I get more pleasure from a lunch than from a lecture. For this reason and others, I found the well-designed-and-presented *Micro Cookbook* the more appetizing of the pair.

Micro Cookbook does not convert your disk drives into a toaster or your monitor into a microwave oven. What it does is offer a specialized database for cooks and bottle-washers: You can thumb through its electronic pages in search of an interesting recipe. If you've got a yen for a Chinese dish or a sudden urge for a piece of pizza, you can ask the program for suggestions from its Oriental or Italian repertoire. Or, you can tell the program some of the contents of your pantry and see if there are any matches. *Micro Cookbook* can print out a shopping list to take to the grocery store, outlining all of the ingredients for your selections (see Figure 1).

The program will also scale up or

```
**SHOPPING LIST

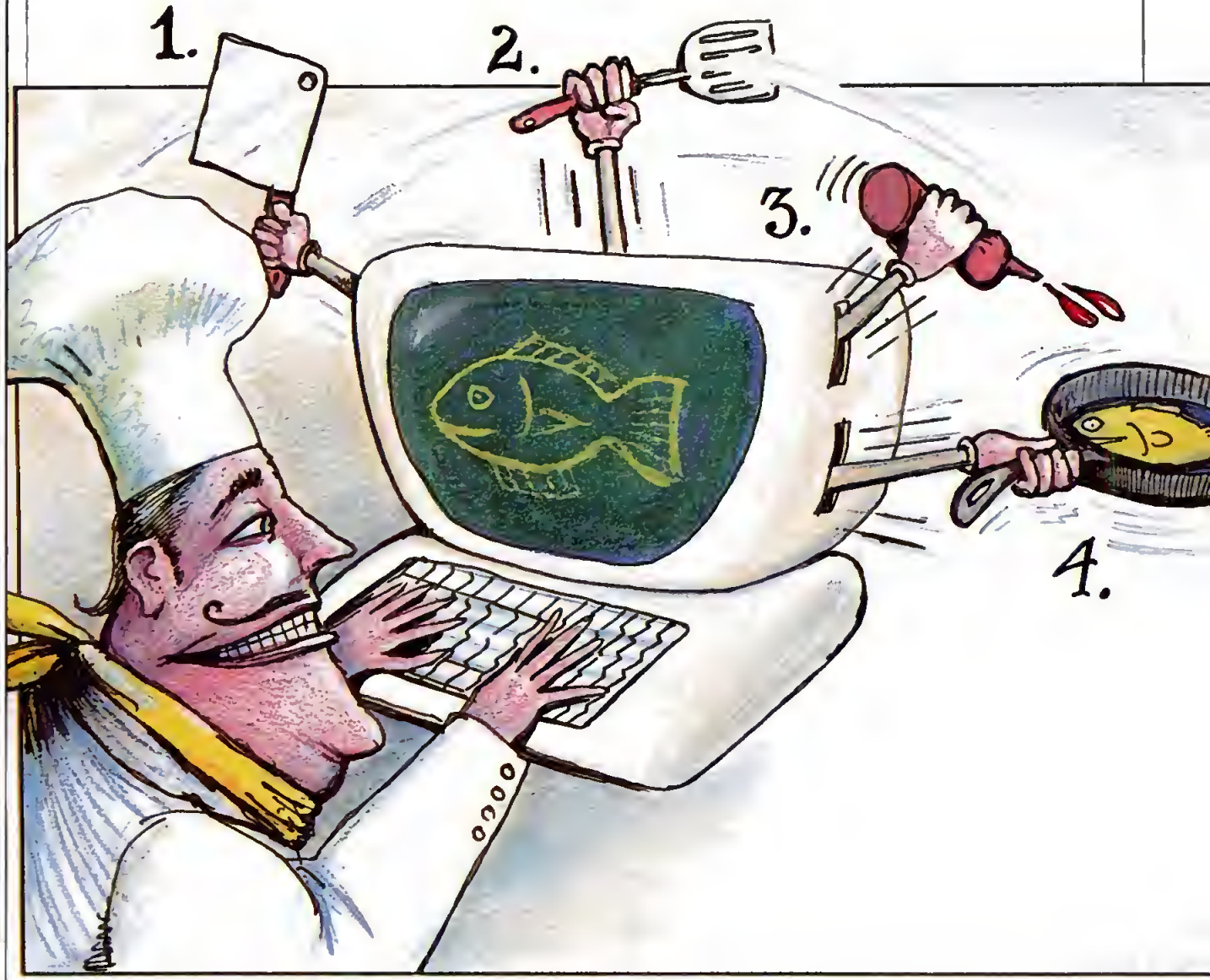
BASIL            BAMBOO SHOOTS      BEAN SPROUT
BUTTER           CELERY             CHICKEN BROTH
CHEESE           CORNSTARCH         GARLIC
ONION            PARSLEY            PEANUT OIL
PIGNOLI          RICE               SALAD OIL
SALT             SOY SAUCE          SPAGHETTI
WATER            WATER CHESTNUT     WHITE PEPPER

INGREDIENT       RECIPE             QTY   MEASURE   PREPARED

BASIL            PESTO SPAGHETTI    1     tbl
BAMBOO SHOOTS    CHINESE VEGETABLES ⅓     cup
BEAN SPROUTS     CHINESE VEGETABLES 1     16 oz     can
BUTTER           PESTO SPAGHETTI    2     tbl
CELERY           CHINESE VEGETABLES 2     cups      sliced
CHICKEN BROTH    CHINESE VEGETABLES 1     10 oz     can
CHEESE           PESTO SPAGHETTI    ¾     cup       parmesan
CORNSTARCH       CHINESE VEGETABLES 2     tbl
GARLIC           PESTO SPAGHETTI    2     cloves    minced
ONION            CHINESE VEGETABLES 1     cup       sliced
PARSLEY          PESTO SPAGHETTI    1     cup       minced
PEANUT OIL       CHINESE VEGETABLES 2     tbl
PIGNOLI          PESTO SPAGHETTI    ¼     cup       minced
RICE             CHINESE VEGETABLES                 cooked
SALAD OIL        PESTO SPAGHETTI    ½     cup
SALT             PESTO SPAGHETTI    1     tsp
SOY SAUCE        CHINESE VEGETABLES 1     tbl
SPAGHETTI        PESTO SPAGHETTI    1     pkg       thin
WATER            PESTO SPAGHETTI    2     tbl       boiling
WATER CHESTNUT   CHINESE VEGETABLES ⅓     cup
WHITE PEPPER     PESTO SPAGHETTI    ⅛     tsp
```

Figure 1: Exomple of o shopping list and recipe outline produced by Micro Cookbook

Dinner?



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CIRCLE 240 ON READER SERVICE CARD

down the quentity of most ingredients to serve a particular number of people. It includes definitions of cooking and preparetion terms (see Figure 2); hints on buying and storing fruits, vegetebles, and meats; a list of ingredient substitutions; and a calorie end nutrition guide.

Ethnic Diversity

Micro Cookbook comes with its own "Basic Recipes" disk. A sort of computerized Betty Crocker, it offers ebout 150 recipes, renging from Almond Chicken to Guacamole to Sole en Gougons to Zucchini Parmesan. The recipes ere classified in 30 different categories, including Ameri-

MICRO cookbook may be just the appetizer in a whole series of add-on modules.

can (Beef Stew and Corn Fritters), Jewish (Keshe Seled end Honeyed Chicken) end Vegetarian (a tempting Lemon Broccoli). There is even a category for "English cuisine," in some quarters e contredictory term. The single selection, London Broil, mey be someone's muted joke.

The progrem can hendle es meny es 255 recipes on a disk, with 255 unique ingredients and 60 clessificetions. Micro Cookbook elso allows you to create your own library of favorite dishes. You are asked (by a menu, of course) to fill out a form with ingredients, quantities, and cooking methods.

The program comes with en ettractively prepered 32-page menual. The instructions on booting up the disk and some of the operating directions are not presented very cleerly, though, end the book could use better orgenization. A number of important instructions and a few additions end chenges to the program are not even in the manual. They can be found by calling up the RELEASE.EXE file on the program disk. A handful of misspellings (including a recurring "Quanity" label on the screen) mar the otherwise careful production. And the manual insists on calling the left-arrow cursor key (below the 4 on the numeric keypad) the "backspece key."

Legal Indigestion

The program is not copy-protected. The company combines a bit of the carrot end breadstick in its opening copyright notice: "Virtuel Combinetics hes invested over two man-years and considerable money developing this product for you, end has priced it low enough so that all computer owners can efford to buy it. Giving e copy to a friend is a violation of copyright lews—we consider it stealing. . . . Virtual Combinatics will pay e $500 reward for information leading to the arrest and conviction of eny person or persons making illegal copies of the softwere diskette or users guide."

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- Select a recipe from the recipe

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index
- Select recipes from the ingredient index
- Select recipes from the classification index
- Select a recipe by ingredients and/or classifications
- Enter, modify or remove a recipe
- Examine a terminology or measurement glossary
- Prepare a printed shopping list or printed recipe;
- Examine a help screen for various options.

Choices are made using the ten function keys. You can move within the various menus by using the Esc key, and make a selection with the aid of the Ctrl and C combination.

A modest text editor is included in Micro Cookbook to allow entry and correction of selections and ingredients entered onto the screen. The system is adequate to the task, but as noted earlier, the choice of the left-arrow for backspace in lieu of the backspace key was confus-

```
CHOP: Cut into pieces using a
   sharp tool. Hold knife tip
   down with one hand and move
   blade up and down, chopping
   food with the other.

CRUSH: Press with garlic
   press, side of knife, or
   mallet to extract the juice
   of an ingredient.

CUBE: Cut into cubes of a half
   inch or larger.

DICE: Cut into cubes of a half
   inch or less.

GRATE: Cut into tiny pieces
   using the small holes of a
   grater.

MODE: REFERENCE

JULIENNE: Cut into small
   sticks.

MINCE: Cut into very small
   pieces. Smaller than chop
   but not crushed.

PARE: Cut off the outer
   covering with a sharp tool.

PEEL: Strip off the counter
   covering.

SHRED: Cut into thin pieces
   using the large holes of a
   grater.

SLIVER: Cut into long thin
   pieces.

SNIP: Cut into very small
   pieces without any chopping
   action, using scissors.
```

Figure 2: Glossary of preparation terms from Micro Cookbook

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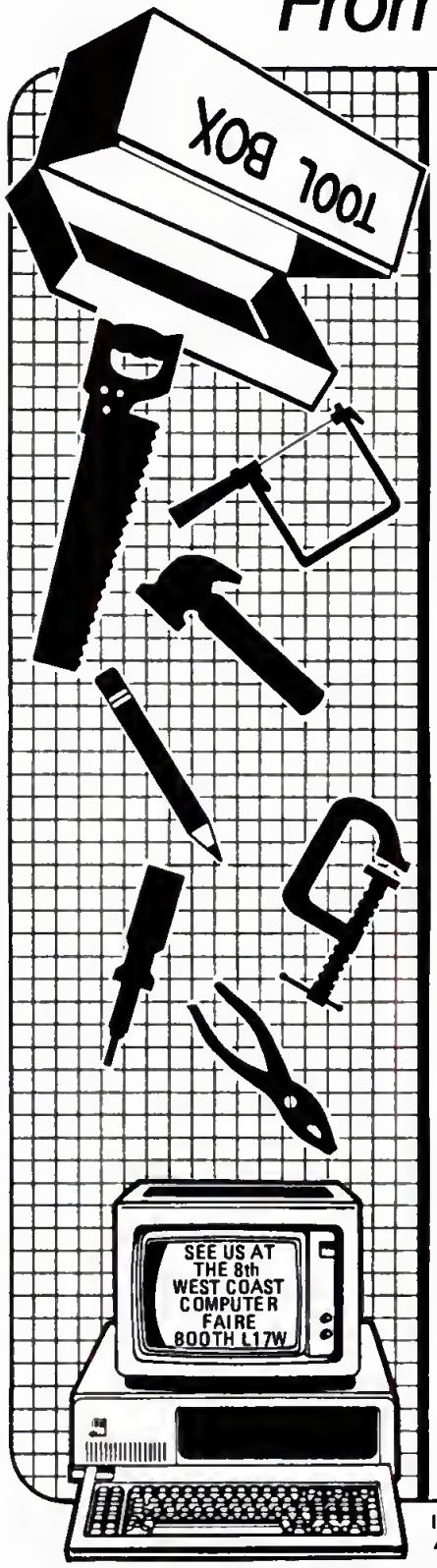

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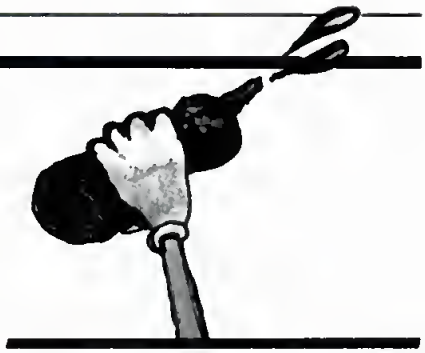
ing.

The shopping list function is valueble. It will combine into one list several dishes you have selected, elthough it does not autometically weed out items already on your shelf. It includes some rather weak humor: "Run out and buy some water to cook thet spaghetti," it edvises.

The database system works well. The program is very strict in its requirements. There are no globel seerches or partiel searches, for example. If you want to know ebout berry recipes, you'll have to ask specifically for strawberries or raspberries or blueberries. The program will correct for singular/plurel discrepencies; though. Asking for onion will also yield informetion on onions.



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CIRCLE 272 ON READER SERVICE CARD

A HANDFUL OF misspellings mar the othewise careful production.

According to another billboard accessible from within the program, Micro Cookbook may be just the first in a whole series of edd-on modules. Future offerings might include additional recipe books, nutritionel anelysis, a kitchen inventory peckage, end e commercial version for large kitchens.

All in all, Micro Cookbook is e tasty morsel for your PC.

Diet Monitor

However, Diet Monitor, from Camrass Corporation, is e whole otber kettle of fish. It is e very embitious, earnest program, but in the end it's an inelegant creation, sort of a collapsed soufflé.

The program is designed to perform a complete nutritionel anelysis of all the food you've eaten in a particular day or during the week. The enalysis is compared to the Recommended Daily Allowance calculated for your age, sex, weight, frame, and activity level. Tbe program cen elso fector in pregnency, and can be biesed to look for particuler levels of nutrients, vitamins or other substences you mey require.

The output is prodigious: e full-pege enalysis of 29 different items, including calorie content, cholesterol, various minerels and vitamins, end other requirements. You're shown a celculated everage deily inteke, e recommended ellowence, end an estimate of the deficiency or excess in your diet for each item. Next, the program prints out a bar chart of the same items, showing the percentage over or under the recommended level. And

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CIRCLE 291 ON READER SERVICE CARD

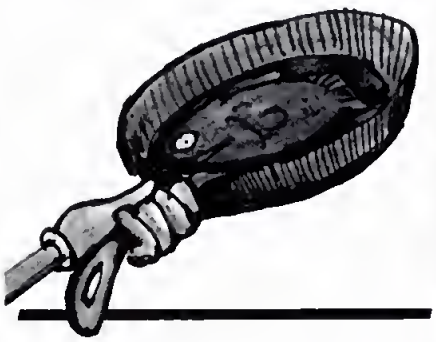
finally, you're presented with several pages of recommendations for altering your diet to address those deficiencies or excesses.

Difficult Menus

This is not a simple program. The menus are complex and bureaucratic, with stark and unforgiving demands for information. Entries are in the form of one- or two-letter choices rather than numbers or any of the function keys. Further, the program demands use of capital letters, an unnecessary stricture for most programs.

The accompanying dot-matrix manual is rather grim, and chock-full of spelling and grammatical errors. (A few make their way to the screen, as well.) I found it perturbing not to have any serious discussion of the theories of nutrition espoused by the program. Instead, you are forced to accept as gospel its criticisms and recommendations.

Diet Monitor includes 758 foods and vitamin supplements with their elements already broken down for charts. The manual does not include a copy of the listing. In order to use the program, you must print out a full listing of the foods with their code numbers.



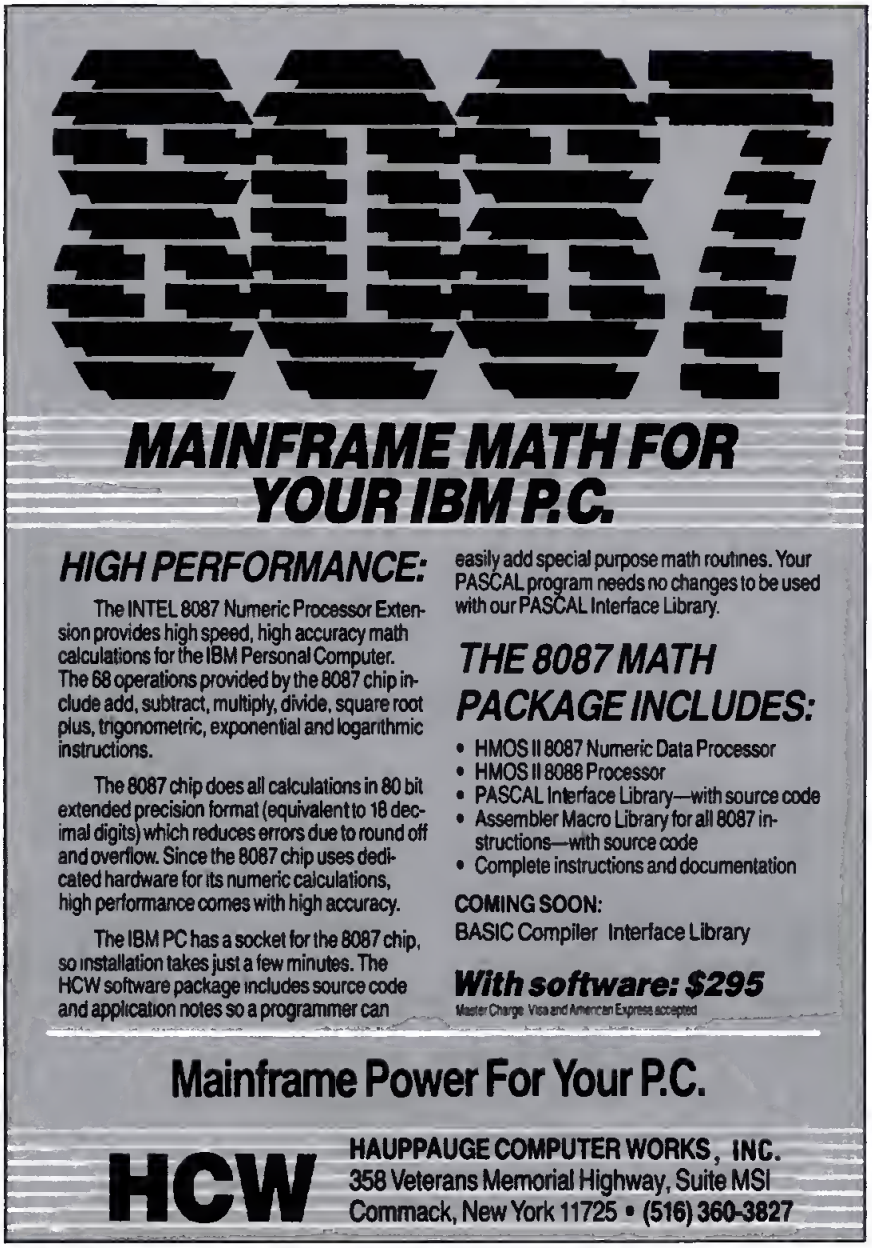
THE PROGRAM works, but requires a great deal of dedication and patience.

The program also has no provision for adding your own foods. If you live on a diet of rattlesnake meat and dandelions, you might find that you are an unlisted number.

To run the program, fill out a day-to-day tally sheet. You can print out the forms on your printer and opt for either once-a-week or day-by-day analysis. The program does not hold onto your input; instead, you get an instant (and ponderous) analysis. The program does not hold onto data. If you are looking for a monthly or annual analysis or a 7-day analysis that does not correspond to the calendar week calculated earlier, you'll have to reinput the data.

The program works, but requires a great deal of dedication and patience. It is by no means fun to use; but then again, who ever claimed that going on a diet was easy? Still, there must be more elegantly-produced applications than this one.

/PC



CIRCLE 258 ON READER SERVICE CARD

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The premier personal and small business financial system. Covering all types of accounts including check registers, savings, money market, loan, credit card and other asset or liability accounts, the system has these features:

- Monthly Transaction Reports
- Budgets Income & Expense
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COLOR CALENDAR

Got a busy calendar? Organize it with Color Calendar. Whether it's birthdays, appointments, business meetings or a regular office schedule, this program is the perfect way to schedule your activities. The calendar display is a beautiful **HI-RES** color graphics calendar of the selected month with each scheduled day highlighted in color. Using the daily schedule, you can review any day of the month and schedule an event or activity in any one of 20 time slots.

For Apple II (48K) $30.00

BUSINESS SOFTWARE SERIES

Both Programs $250.00

A user-friendly yet comprehensive double-entry accounting system employing screen-oriented data input forms, extensive error-trapping, data validation and special routines for high speed operation. The series includes these two modules:

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- Up to 500 accounts and 500 transactions per month.
- Interactive on-screen transaction journal
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  - Balance Sheet
  - Account Listings

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ACCOUNTS RECEIVABLE

A flexible system with these features

- Up to 500 accounts and up to 500 invoices per diskette.
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- Interfaces to General Ledger.
- Interactive screen-based invoice work sheet.
- Produces these reports
  - Aged Receivables
  - Sales Analysis
  - Account Listings
  - Customer Balances

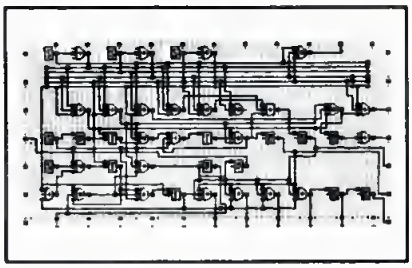
For Apple II (48K) & IBM PC (2 DRIVES) $150.00

LOGIC DESIGNER & SIMULATOR

An interactive **HI-RES** graphics program for designing and simulating digital logic systems. Drawing directly on the screen the user interconnects gates, including **NAND, NOR, INVERTER, EX-OR, T-FLOP, JK-FLOP, D-FLOP, RS-FLOP, USER-DEFINED MACRO** and **N-BIT SHIFT REGISTER** types. Network descriptions for the simulation routines are generated automatically

The program is capable of simulating the bit-time response of any logic network responding to user-defined source patterns. It will simulate networks of up to 1000 gates. Includes a source pattern editor, **MACRO** editor and network editor. Produces a fan-out report. Simulation output is a string of 1's & 0's representing the state of user selected gates for each bit time of the simulation.

A typical page of a logic drawing looks like this:



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MANUAL AND DEMO DISK: Instruction Manual and demo disk $30.00

MATHEMATICS SERIES

The Series Includes These 4 Programs:

STATISTICAL ANALYSIS I: This menu driven program performs **LINEAR REGRESSION** analysis, determines the mean, standard deviation and plots the frequency distribution of user-supplied data sets

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MATRIX: A general purpose, menu driven program for determining the **INVERSE** and **DETERMINANT** of any matrix, as well as the **SOLUTION** to any set of **SIMULTANEOUS LINEAR EQUATIONS.**

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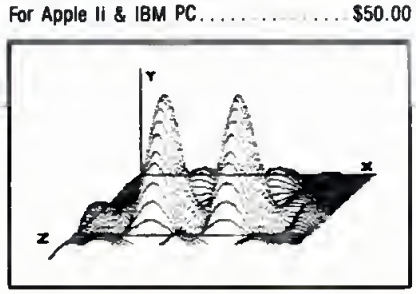
For Apple II & IBM PC $50.00

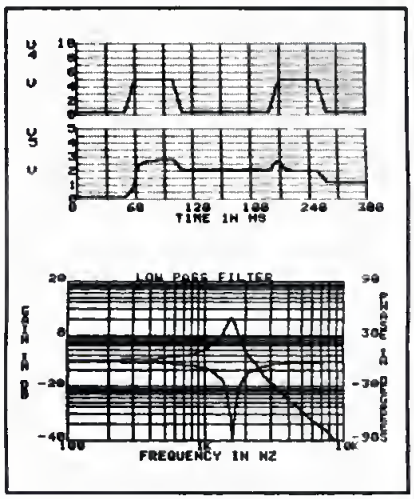


μCAP

Microcomputer Circuit Analysis Program

Tired of trial & error circuit design? Analyze and debug your designs before you build them. With **μCAP** you simply sketch your circuit diagram on the CRT screen and run an **AC, DC** or **TRANSIENT ANALYSIS.** Your circuit may consist of **RESISTORS, CAPACITORS, INDUCTORS, DIODES, BATTERIES, BIPOLAR** or **MOS TRANSISTORS, OPAMPS, TRANSFORMERS,** and **SINUSOIDAL** or **USER-DEFINED TIME DEPENDENT VOLTAGE SOURCES. μCAP** can analyze any such network containing up to 40 separate nodes. Includes a user controlled **MACRO** library for modelling complex components such as **OPAMPS** and **Transistors.**

Typical **μCAP AC** and **Transient Analysis** graphs:



For Apple II (48K) & IBM PC (2 DRIVES)$475.00
Manual & Demo Disk $30.00

ORDERING INSTRUCTIONS: All programs are supplied on disk and run on Apple II (48K) with a Single Disk Drive or IBM PC (64K) with Single Disk Drive unless otherwise noted. Detailed instructions included. Orders shipped within 5 days. Card users include card number. Add $2.00 postage and handling with each order. California residents add 6½% sales tax. Foreign orders add $5.00 postage and handling per product.

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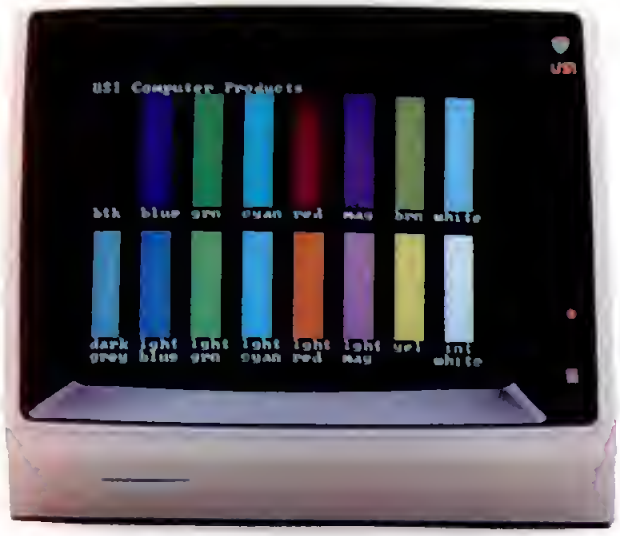

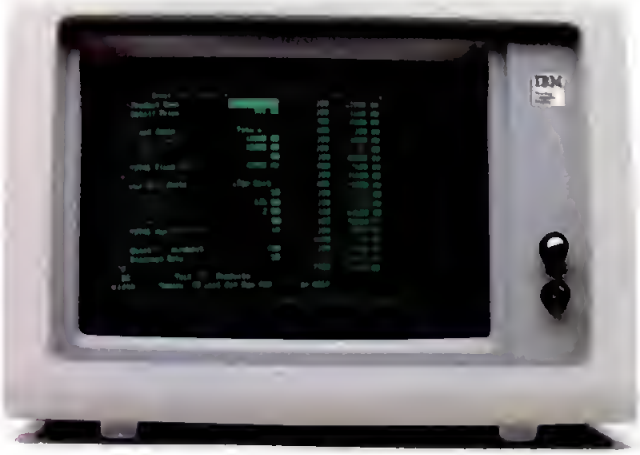

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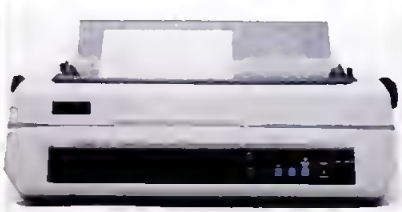

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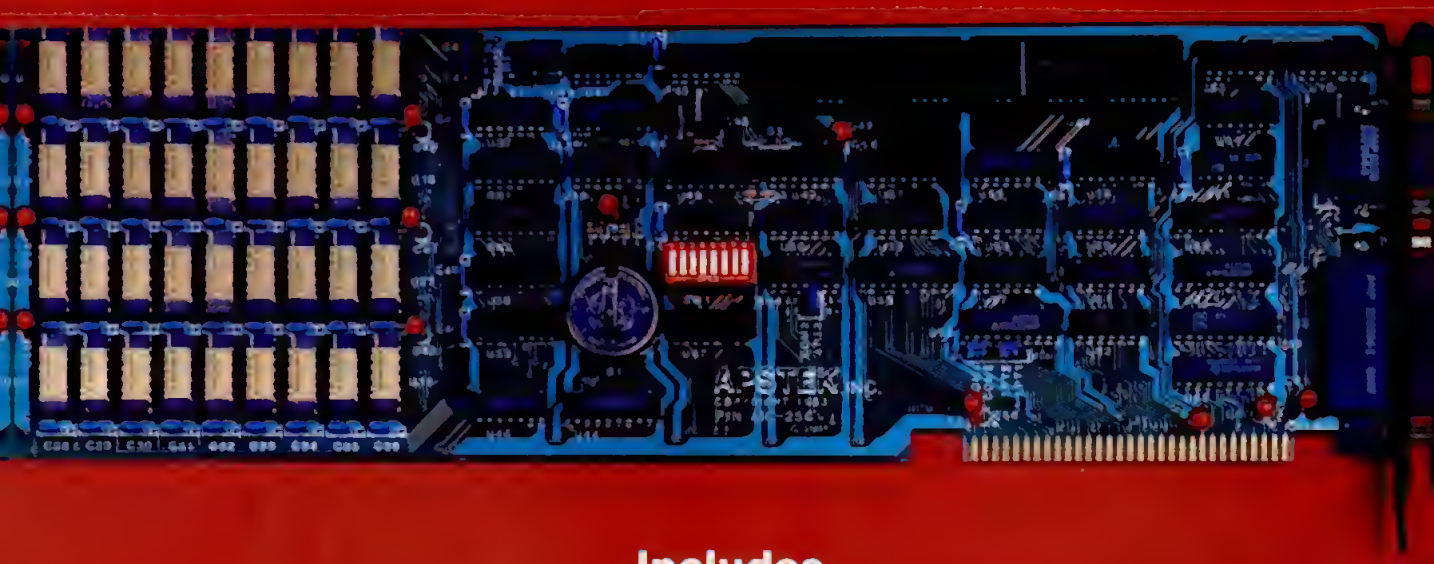
CIRCLE 478 ON READER SERVICE CARD

APSTEK has taken the pain out of multi-function cards for your IBM PC



Includes

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- CLOCK/CALENDAR - eliminates the need to manually s time and date on every power-up; reliable long-life lithiu battery for maintaining time and date when system pow is off; includes time and date-set software.

SOME OF WHAT YOU GET FROM OTHERS:

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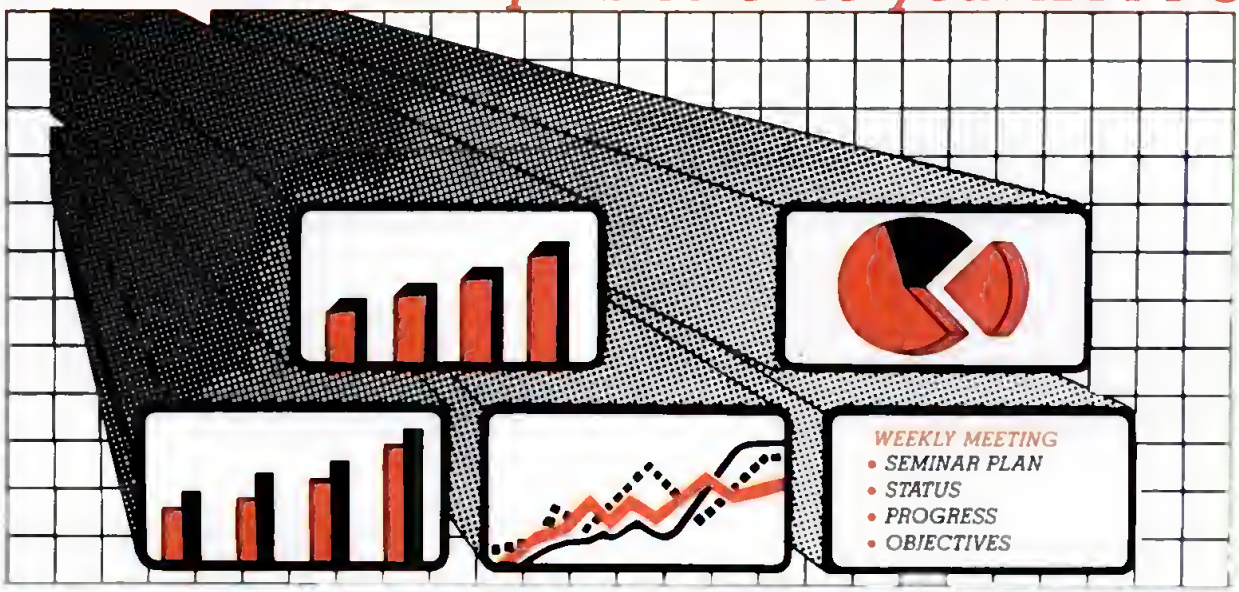
CIRCLE 123 ON READER SERVICE CARD

Business Graphics for the IBM Personal Computer

CHARTMAN now puts color to your IBM PC



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For financial managers, executives, consultants, non programmers and businessmen. This CHARTMAN program turns columns of numbers into graphical charts, which are quickly and easily understood. It brings out the messages buried in piles of data and raises productivity.

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The new CHARTMAN series combines a "Menu Driven" concept with the "Input Form Fill-in-the-Blanks" new software technology to provide a highly advanced and user friendly program.

CHARTMAN series are not converted from other microcomputers but rather are specially designed for and utilize all the powerful features of the IBM PC.

Major contributions of the new "CHARTMAN" series of programs:

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CIRCLE 492 ON READER SERVICE CARD

WORD PROCESSING/WILL FASTIE

This heavy-duty program can handle practically any word processing chore, but among other faults, it lacks the "human touch."

Spellbinder Comes To The PC

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CIRCLE 700 ON READER SERVICE CARD

I have a very clear notion about how to evaiuata word processing software. It's the same notion I have about avaluating any software product, particularly the interactive ones. The first order of business is an assessment of tha product's functionaiity, foilowed by an ettempt to understand how it was engineered. By using the progrem, i try to get the best possible feeling for its human factors, for how well it reletes to its master.

THE TUTORIAL is a source of uneasiness for the IBM PC user.

For me, thare ere two cetegories of word processor programs. One I cali "world class," meening thet the program providas tha feature and function of the dedicated word processing systems; the other category consists of those programs that don't heva this capebility. Spellbinder is a world class word processor, in tha same category es WordStor, WordPerfect, and MultiMote. Membership in this select group is perheps the best measure of a program's capabiiities. On the othar hand, tha vary small computer merket has reached a point at which more then one generation of software technology is visible. Since Spellbinder, like WordStor, is a first ganeration product, this implies an

imperfect but meaningful matric for tha engineering of tha program.

I FOUND ALL the embedded commands to be cryptic and complicated.

Documentation

Since the manuel is a usual starting point for someona baginning a naw program, I concentrated on that first. A large section of the manual is devoted to e tutorial, e good sign for any program. Although thare are occasional spalling mistakes, the tutorial is basically well writtan. It will get the first time user off to a good start, though not enough of the sampla text ltams are availabla on the disk. Tha usar is forced to type sample text In order to try the particular feature under discussion. This slows tha tutorial down, somathing I found quite frustrating.

Tha tutorial ls also a source of uneaslnass for the IBM PC user, since some of the descriptions do not quite match tha effects displeyed. This is only tha tip of e much larger iceberg: the tutorial is datad Decamber 1981 for sarias 5.1, while the rest of tha document is dated August 1982 for version 5.12. The program delivered to ma was version 5.20, and from detes on the disk files, eppaared to be manufactured in November 1982. I soon discovared that the documentation dascribes only tha ganaric product for the CP/M anvironmant, supplying only two pages of supplemental informetion for the IBM DOS environment. In addition, this information does not become useful until the program is better understood.

Tha problems with the menuel are compoundad by tha lack of an index. Onca locatad, howaver, the informetion ls complete and the writing is clear and consistant. The manual is also well-organizad, with tabs separating tha different sections.

Getting Started

Spellbinder loads from disk quickly, displaying its "hallo" screen. The very strange message, ![HIT A KEY]!, invites you to hit one of four activa function keys, to activate useful functlons such as filing, or eny other key, to advence to the main

SPELLBINDER on the PC tries to overcome the command code problem by placing most functions on the function keys.

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displey screen.

The mein screen is divided into four sections. The bulk of the displey is given to the text aree, ebout 20 lines worth. The bottom of the screen has a "softkey" display, ectually e visual menu of the functions eveilable from the PC's 10 function keys. The top line (and sometimes the top two lines) is used es a stetus and command aree. When the word "COMMAND:" eppears, the progrem is ready to eccept either typed commends or depressions of active function keys. Errors in command entry are indicated et the fer right of the top line. When the word "EDIT" eppears, text cen be entered or commends of various kinds can be invoked with control characters, escape sequences, or depression of ective function keys. The center of the line contains various indicators, such es the line and column number of the current cursor position end the current text mode.

Modes

Spellbinder is very much given to modes of operetion. Along with the command/edit mode, it elso conteins e text mode which ellows operation on charecters, words, sentences, paregraphs, or merked blocks of text. Text entry is normally e replecement operetion, but en insertion mode can be selected. Depending on which modes are ective and which commends heve been issued, the softkey displey takes on different velues.

ON THE IBM, it is absolutely necessary to take your eyes from the screen to find the right key.

Since nevigation through the program depends on an understanding of the stete of the system et any moment, I found the system very difficult to approech end I was very uncomforteble using it. The most difficult problem I had, probebly because of my experience with WordStor and WordPerfect, was that I often tried to type a command when I wes in edit mode. Although the progrem does not have as many commend sequences as WordStar, I found it more difficult to use beceuse I often heslteted while I tried to determine how to invoke e perticular command. Further confusion results beceuse there are sometimes two weys to eccomplish the same thing.

A simple example is moving the cursor to the beginning or end of the file. In commend mode, the letters "T" and "E" accomplish the function. In edit mode, the seme letters preceded by the escape (Esc) key elso do it. More compliceted is the case of moving to a mark in the text. Edit mode Esc "F" and "B" commands move the cursor forwards end backwards to the next mark. The same letters in commend mode work, but other options can be edded. I found myself trying to use these options in the edit mode versions, which does not work.

Commands and Keys

Inconsistency within commands did not help either. F moves forwerd to a mark; FF sends a form feed to the printer; and FY, FT, end FH heve to do with text formetting. H or H followed by e number are hold commands, while HE and HEO are help commands. The worst is the G series: G meens get text from a file, GD meens the edit is done (it stands for "global done," but I couldn't get the word "get" out of my mind whenever I used eny form of this commend), end GQ meens to ebendon the edit (globel quit). There are other examples.

Spellbinder on the PC tries to overcome this command code problem by placing most functions on the function keys. The idea is not bed, but it tekes an unexpected turn. As you strike function keys, the softkey displey changes, in effect giving you a new menu. Now this, of course, is exactiy whet softkey operation is ell ebout, but unfortunately the PC is not reelly built for it, and products like Spellbinder thet try to use the feeture suffer because of it. The problem is thet there is no logical connection between the assigned function key and the operetion to be selected. Hewlett-Packard systems, with the keys pleced directly below the softkey displey on the screen, are the best implementation. On the IBM, it is ebsolutely necessery to take your eyes from the screen to find the right key: even the position on the screen does not relete to the physical plecement of the key.

While it is true thet a design shortcoming in the PC is not Spellbinder's feult, I think the programmers should heve evoided this temptation in fevor of their original CP/M implementation of control key sequences, à lo WordStor. Although

CURSING DID not help, nor could I find a clue in the manual.

all those sequences are present in the IBM implementation, the menus have given way to the softkey display.

The result of all this wes thet I found myself using letter commends in commend mode elmost exclusively, because they were et least eesier to understend and learn.

Embedded Commands

There are two kinds of commands, most of which relete to printing, thet are written into the text of the document.

Dot commends occupy e line of their own. The line begins with e dot (period) and the letter for the specific dot command. In some cases, the commend is followed by text. The more common dot commands are .C to center e line of text, .E to force a new pege, .H to define the text for heeders and footers, and three .Y commends to control formatting.

In-line commands take e variety of forms. The most common are @ to indicate a merge field, # to pess arbitrary codes to the printer, end ! to ectivete changes in font, line spacing, and enhancement, among others.

In general, I found all the embedded commands to be cryptic end complicated. The worst cases, end the most needed ones, are the two "Y-table" formatting commends. The Y-table has 14 parameters that control most aspects of print formetting. To change from single specing to double spacing, a .Y command must be included in the text with the sixth parameter set to 2. A typicel commend might be:

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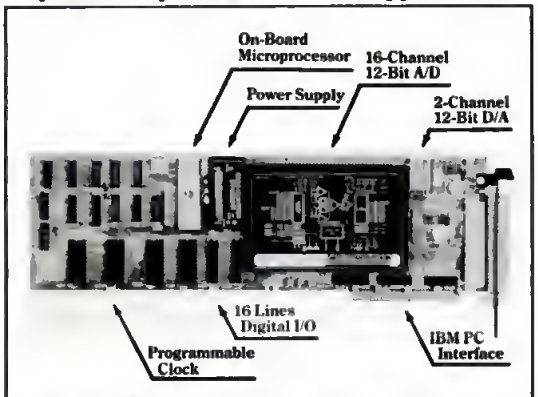

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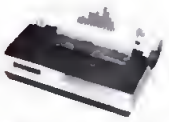

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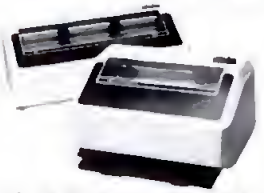

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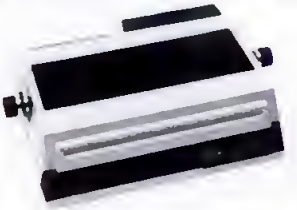

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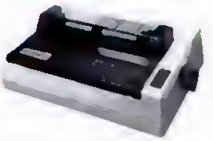

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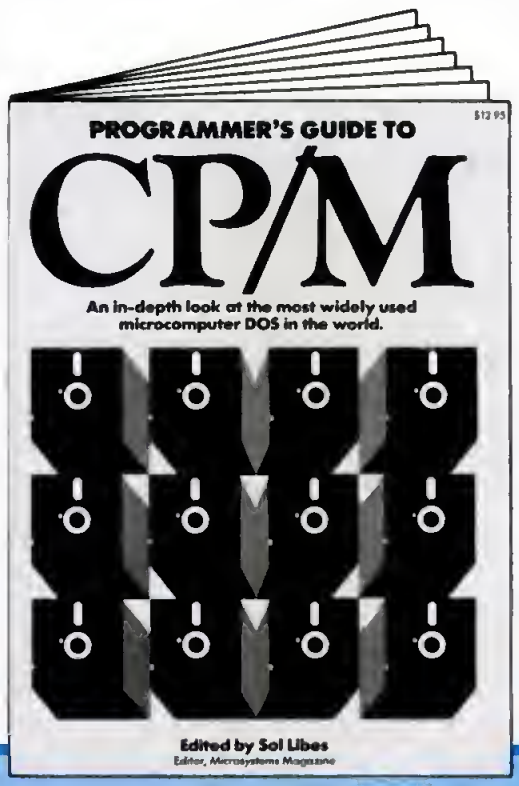

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Spellbinder providas a quick way to enter this table with a singla keystroka, and you can then edit it to change whatever part of the file you like. Of course, this assumes you can remember which of tha 14 numbers you need to change. The YT-tabla has only 12 controls for headars, footars, paga numbers, and margins. To completely specify margins other than the default, both a Y- and YT-table are required.

I WAS downright angry at three things as I came to know this program.

Spellbinder Speaks

For tha most part, Spellbinder spoka up whan I mada arrors and triad to guida me along. There are some notable exceptions, and some points of confusion.

The program frequently detects an arror of ona sort or anothar and displays a messaga telling you about it. In these cases, the screen clears and tha massaga is the only thing visible. In fact, there is not avan a clue about what your naxt stap should be. This happened to ma first when I triad to axit Spellbinder without having closed the filas. The message appeared to tall me that I had to rectify that situetion before I quit. And there it stayad.

Cursing did not help, nor could I find a clue in the manuel (no list of errors and agein, no index), so I finally did what I always do whan I get stuck: I started hitting kays, Enter first. That worked, end got ma back to the main display. Thera is just no excuse for thet kind of program behavior.

The plecement of the commend and status area at the top of the screen saems okay, until the discovary that some status or information massages are displayad et tha bottom. It happans to ba hard to saa this happan, sinca tha messages are emittad in revarse video, the same as the softkay display. In fact, it is sometimas hard to know that Spellbinder is talking to you because only some messages include a beep to alert you.

Irritations

I was downright angry at three things as I cama to know this program. First, I was never able to figure out how to get Spellbinder to accept a different printer as its default. My home system has the IBM printar; I do not own a latter-quelity machina, callad a "precision printer" in the Spellbinder documentation. Tha initial configuration session asks whether or not you have a precision printer and if so, what type, but the printer format table is always set for a precision printer when the program begins execution.

Second, tab settings are not retainad with tha document. From a Spellbinder parspectiva, this is not required because the program doas not actuelly store tab charactars in the taxt. When tha tab key is used the necessary number of spaces are placed in the text. However, this means that the tab settings for complicated tables or differing sections of tha sama document have to be set manually as required.

Third, and this one may be a little picky, the exit command X did not, and at the same tima gava no indication of why it would not. It develops that the X command and depressing the softkay labelled "Exit" are not the sama. The function key invokas a macro that checks the condition of the system and at least tells you why it will not exit when you have so commanded. A failing X command returns you to edit moda with no explenetion. Using the axit kay gava ma tha clue I needed: filas wera opan, and X won't work in that case.

THE MACRO feature of Spellbinder is probably its strongest selling point.

Macros

Tha macro feature of Spellbinder is probably its strongest selling point. Tha feature is actually a little programming

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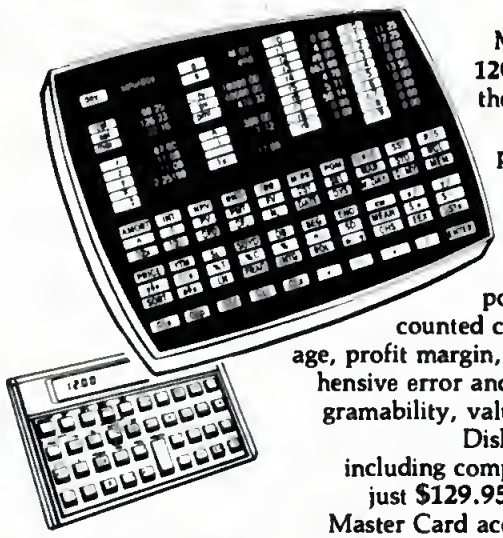

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language called "M-Speak," which allows Spellbinder to be extended to include new functions and features. In fact, Lexisoft has used the facility to provide a number of features as standard parts of the system. These include two column printing, sorting, mail merge, column editing, key phrases, forms generation and fill-in, automatic boilerplate

SPELLBINDER falls a bit short, and could use significant improvement.

operation, and math functions.

M-Speak is so powerful that I think Spellbinder itself could be implemented with it. But as powerful as this capability is, it is a little over the head of the average user. It is not much more difficult than BASIC, but it is more cryptic.

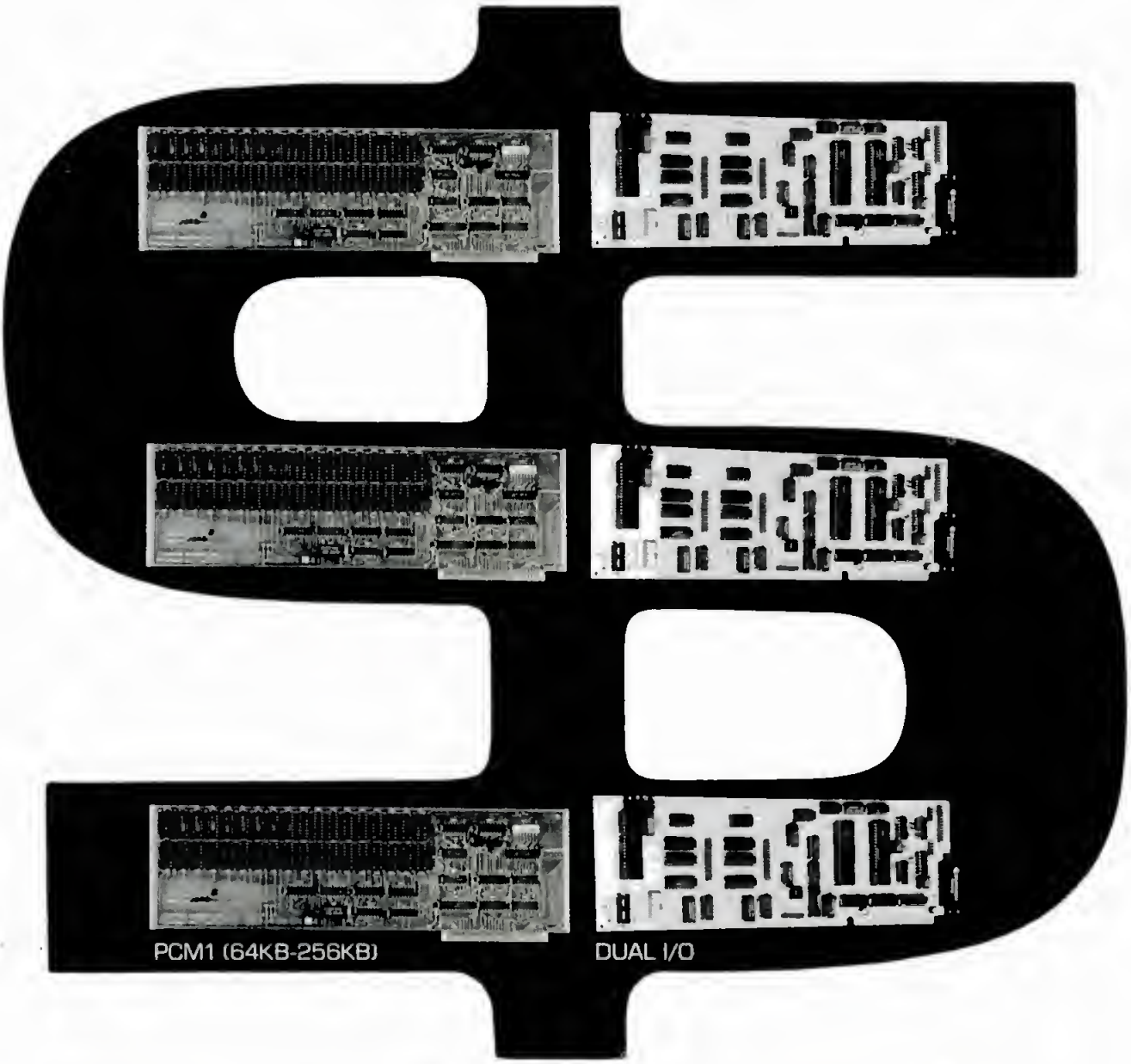
Printers

Spellbinder offers good support for printers. A number of popular "precision" printers are supported and the program has the flexibility to get the most out of them.

The most interesting feature of Spellbinder is the space table. This is a table which defines the spacing to be used for each character in a proportionally spaced character set. The table is easy to edit (by Spellbinder, of course) and equally easy to use. The document describes this as an out for the user who does not care for the choice made by Lexisoft.

Summary

For all the problems I have cited, Spellbinder does have the capability to handle just about any word processing chore. Using M-Speak to write programs, it can be enhanced or customized to your specific needs. The interaction between it and user, the human interface, is the weak point. Given enough time and practice, of course, you can learn to overcome this problem. For general use, however, I would have to say that Spellbinder falls a bit short, and could use significant improvement. */PC*



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Computers come in two parts.

One part is the "hardware," which is the machinery itself. The other is the "software," or a program, as it's sometimes called.

Software is the part that tells the computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything.

And vice versa.

You have to buy both.

Buy the software first.

Since the reason you're buying a computer is to get the capability the software gives you (remember, it's the software that knows how to get things done), it makes good sense to pick the software first.

Start by making a list of the things you want to use the computer for. It can include almost anything—any kind of inventory, filing, accounting, graphics, reporting, record-keeping, analysis—you name it and there's probably a software program that does it.

Next, take the list into a computer store and ask the salesperson to give you a demonstration of the program, or programs, that will do the things you want.

Even though you'll need a computer for the software demonstration, keep in mind the computer is just a vehicle. The software is the driver. And once you've decided on the software, picking out the rest of the computer system will be much easier.

The simpler the better.

Look for software that's easy to learn, easy to use, and that does the job in the simplest way possible.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you have to do without getting in the way.

Meaning there are no complicated routines to follow to perform a simple task. And no programming language to learn.

Some people, however, will tell you that software has to be complicated to be powerful.

Nothing could be farther from the truth.

Because in order for a program to appear simple to you on the outside, it has to be extremely complex on the inside.

ABOUT BUYING A HERE'S SOME HELP.

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

You simply have to see for yourself.

You can read any number of interesting books and magazines about personal computers. You can ask friends who have them. You can look at all the sales literature you can get your hands on. And you should do all those things before you decide to buy.

But as helpful as all that can be, there really is no substitute for a real, live demonstration.

When you do go out shopping, we recommend you take a look at the PFS® Family of Software.

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How would you like to have your PC greet you with a sunny "Good Morning" every time you turned it on? Or ask you in your own voice to enter the data you need to process? Or even better, edd dramatic sound effects to your homemede programs? And do eli this at a price so low you'll think it's a typographical error?

Dragon Date Systems, a Vencouver, British Columbie software company whose motto is "We bring out the beast in your computer," has just released a sizziing piece of software it calls PC Porrot. The program works by digitizing words and sounds that you enter through an ordinary tape recorder that plugs into the little-used cessette port of the PC. It translates each 1.5 seconds into e charecter string thet you can convert back into feiriy recognizabie sounds with a simple utiiity supplied.

Compeny President Anetoliy T. Chumek reedily admits that his software is neither e substitute for onscreen text messages or the equivelent of en expensive hardware synthesizer. "Some words

Illustration: Bob Conrad

come out well, others as can be expected with one bit of vertical resolution. But it does open up some new frontiers. Our most satisfied users are those who find it a terrific enhancement tool for their BASIC programming." The tinny transistor radio quality speaker in the PC doesn't help much.

The magical thing about PC Parrot is that it will reproduce sounds in an approximation of your own voice rather than in the flat, nasal robot tone favored by many hardware devices. And you can use it to create fairly authentic sound effects to accompany graphics on the screen. For instance, if you're writing a maze game, you can incorporate the sound of heels slapping down a hallway. Or illustrate a crash with a realistic crunch of metal, taken from a sound effects record. Or add assorted screeches and animal noises to signal wrong turns.

PC PARROT will reproduce sounds in your own voice.

Chumek hopes that purchasers will experiment, and compile libraries of their most lifelike or interesting sounds that they could swap with other Parrot programmers. He thinks PC user groups would be ideal for this.

Showing Off

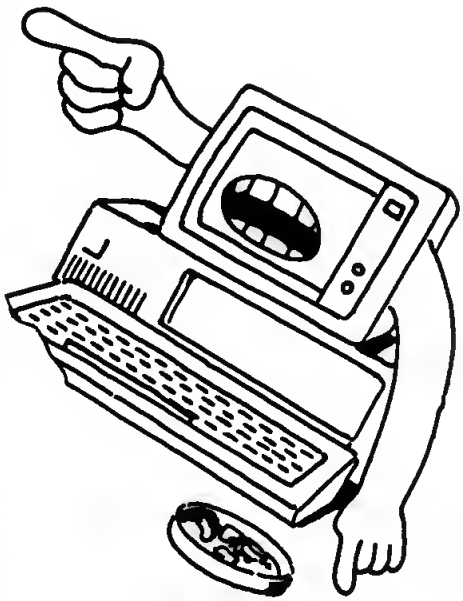
One application that should become immensely popular is demonstrating your PC to curious friends who stare at it and ask, "Well, what can it do?" Since the PC speaker is hidden, it looks almost as if the microprocessor has somehow sprouted a larynx. The effect is somewhat magical.

Using the program is fairly simple once you get the hang of it. If you want to create your own sounds, it allows you to play them back as you record them so you can make changes in volume and tone. And it makes naming each sound easy, although you have to keep track of what sounds you've already recorded so you don't write over an old one by saving a new one with the same name.

THERE are some nice touches and some sloppy ones.

The disk comes with three vocabulary files containing nearly a hundred already-recorded words and syllables, including the letters of the alphabet and a dozen or so digits. However, the cryptic single sheet of instructions doesn't provide much guidance on playing these back.

To hear these prerecorded sounds, you must merge at least two files from the disk. The easiest way to do this is to go into BASICA, load "SAY.TXT" (the one-



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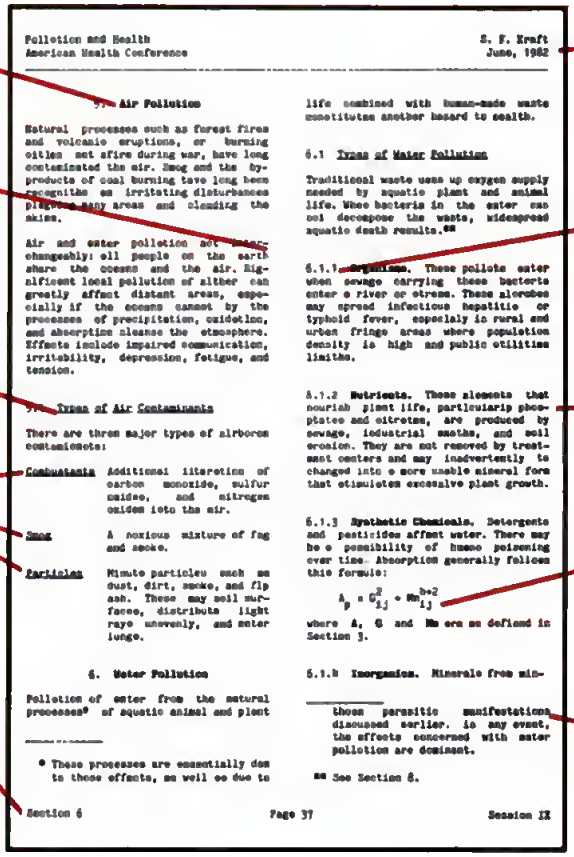

Pollution and Health
American Health Conference

S. F. Kraft
June, 1982

5. Air Pollution

Natural processes such as forest fires and volcanic eruptions, or burning oilfields set afire during war, have long contaminated the air. Smog and the by-products of coal burning have long been recognized as irritating disturbances plaguing many areas and clouding the skies.

Air and water pollution act interchangeably: all people on the earth share the oceans and the air. Significant local pollution of either can greatly affect distant areas, especially if the oceans caused by the processes of precipitation, oxidation, and absorption cleanse the atmosphere. Effects include impaired communication, irritability, depression, fatigue, and tension.

5.1 Types of Air Contaminants

There are three major types of airborne contaminants:

Combustants — Additional liberation of carbon monoxide, sulfur oxides, and nitrogen oxides into the air.

Smog — A noxious mixture of fog and smoke.

Particles — Minute particles such as dust, dirt, smoke, and fly ash. These may soil surfaces, distribute light rays unevenly, and enter lungs.

6. Water Pollution

Pollution of water from the natural processes* of aquatic animal and plant life combined with human-made waste constitutes another hazard to health.

6.1 Types of Water Pollution

Traditional waste uses up oxygen supply needed by aquatic plant and animal life. When bacteria in the water can not decompose the waste, widespread aquatic death results.**

6.1.1 Organisms. These pollute water when sewage carrying these bacteria enter a river or stream. These microbes may spread infectious hepatitis or typhoid fever, especially in rural and urban fringe areas where population density is high and public utilities limited.

6.1.2 Nutrients. These elements that nourish plant life, particularly phosphates and nitrates, are produced by sewage, industrial wastes, and soil erosion. They are not removed by treatment centers and may inadvertently be changed into a more usable mineral form that stimulates excessive plant growth.

6.1.3 Synthetic Chemicals. Detergents and pesticides affect water. There may be a possibility of human poisoning over time. Absorption generally follows this formula:

$$A_p = G^2_{ij} \cdot Mn^{b+2}_{ij}$$

where A, G and Mn are as defined in Section 3.

6.1.4 Inorganics. Minerals from mineral

* These processes are essentially due to these effects, as well as due to these parasitic manifestations discussed earlier, in any event, the effects concerned with water pollution are dominant.

** See Section 8.

Section 6 — Page 37 — Session IX

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lina utility that plays back the sounds), then merge one of the three word files (named VOCAB-01.ASC, VOCAB-02.ASC, and VOCAB-03.ASC) from the disk into it. Finally, to hear it say "eleven," enter a line of BASIC that says: 5000 CALL SAY(ELEVEN$). Substitute the names of other strings inside the parentheses to hear other sounds. You can get

THIS prevents PC Parrot from starting off every sound with the distinctive IBM keyboard click.

an onscreen list of all the prerecorded sounds on the disk by going into DOS, typing TYPE plus the full name of one of the three VOCAB files, then hitting Enter.

You can also manipulate the strings by playing and saving parts of them to create a sort of crude phoneme alphabet. This allows you to create some very bizarre noises, but takes quite a bit of trial and error programming.

Nasty Habits

The program has a nasty habit of hanging if you tell it to call a string that is not on the disk. And if you try to merge two vocabulary files, you must remember to renumber the old one before you merge the new one or they'll both try to fill the same space.

The documentation speaks of an "extensive vocabulary" of "numeric digits, alphabet, business, scientific and of course recreational oriented words." Unless several files were left off the disk I was using, the only available words other than numbers and letters are "count, say, what, ever, want, me, and, easy, now, do, you, think, of, thet, up, down, page, home, end" as well as "uze, rigt," and "lft." I guess their definition of business and recreation is different from mine.

There are three demo programs on the disk. One loops through three or four sentences droning out an introduction while

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printed versions of the spoken words drift across the screen like ticker tepe. This makes e good point; by themselves many of the sounds are hard to recognize. But when they eccompany onscreen text—especielly when one or two words at a time appear on your monitor—the sounds suddenly seem clearer.

Another demo program, celled "DiGITS," simply fleshes the numbers from 0 to 9 on your screen while pronouncing them. This actually has an application. You can get into the BASiC program that makes it work, end chenge it slightly by making the FOR-NEXT loop step lower instead of higher, and then delete the very last line. Whet you'll end up with is e missile-launch countdown suitable for inserting at the beginning of a program to get the viewer's attention.

The remeining demo, "NUMBERS," ellows you to input any number and hear the PC pronounce it. This works fairly well, except that Dragon Date could have made the display more attractive—the "ENTER A NUMBER" messeges simply scroll down the left edge of the screen. And while the program is smart enough to precede e negative number with a "mi. . .nus. . .," it threw in an extre million and a syntax error every time. PC Porrot handles positive numbers with ease, even croaking out "this. . .num. . .ber. . . ls. . .out. . .of. . .range" if you enter an integer the PC can't comprehend. It tosses off decimal points with the flair of a Hollywood egent, but stumbles hopelessly over commas.

IT THREW in an extra million and a syntax error every time.

The reel edventege of these demos, aside from their parlor magic quelities, is thet you cen take them epert and see how they work. This provides meny shortcuts to creating your own successful programs.

There ere some nice touches in the peckage and some sloppy ones. Meny sounds will take up the full 1.5 seconds alloted. But if you record e short sound, it will truncate the "dead air time." This is useful if you're stringing sounds together and don't want lots of ewkward pauses in eech phrase. Another clever feature is that the recording mechanism is sound-activeted, allowing you to gather your wits before you blurt out a syllable. And after you hit a key to start the recording process, the program even disables itself eutomatically for one second. This prevents PC Parrot from starting off every sound with the distinctive IBM keyboard click. But severel times, various ectivities ground to a helt when the program encounters small syntax errors.

IT HAS some rough edges, and will appeal primarily to PC owners who like to fiddle with BASIC.

Ads for Porrot crow that no extra hardware is needed. This is generally true; you don't have to purchase a costly synthesizer, speaker, or emplifier since versions of these already exist in the PC. But you do need an inexpensive cable to connect your tape recorder or microphone amplifier to the back of the computer.

Dragon Dete's other products include e serviceeble version of Breakout that it calls Block Buster that works well on the monochrome screen. In fect it has a very fast, responsive keyboard-driven paddle, if you like bouncing hlips off other blips. And the compeny is starting to release a small steble of powerful, extremely low-cost utilities.

But it will probably be PC Porrot that puts the company on the map. The program isn't for everybody. It has some rough edges, and will eppeal primarily to PC users who like to fiddle with BASIC or show off their computers to friends. It makes ingenious use of the PC innards, and drews crowds every time. But it's no Votrax. Although PC Porrot lists for $39.95, it is currently available for the introductory sum of $24.95. At thet price it might just fly off the shelves. /PC

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I am enclosing $150 (postpaid and tax deductible)
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Please make check payable to PAY LESS TAX II™
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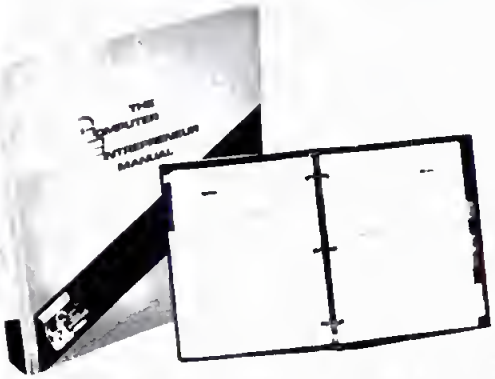

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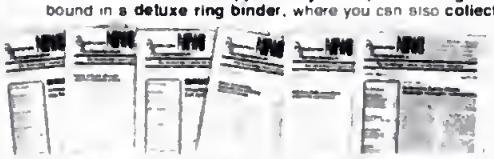

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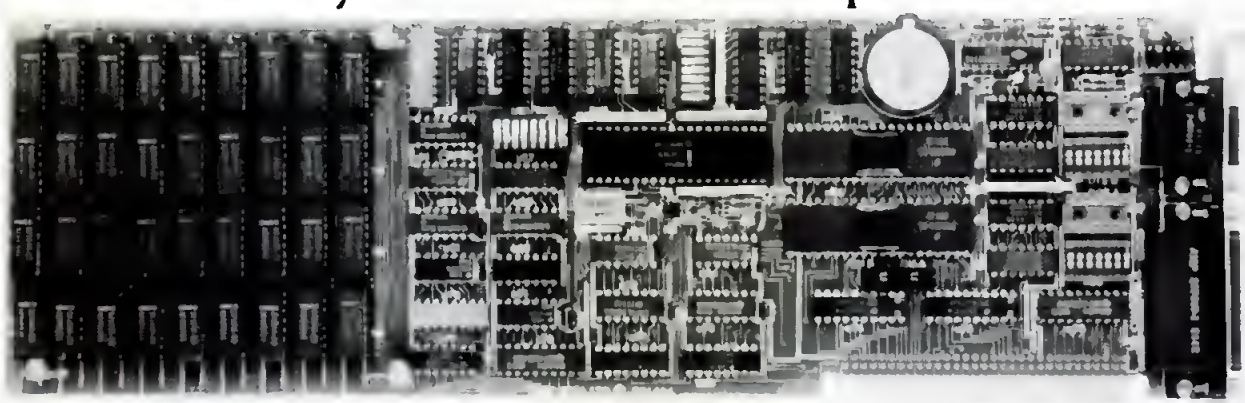
PDI464

Pure Data presents the unparalleled combination board for your IBM* Personal Computer.



The PDI464 features six separate functions — expansion memory, two asynchronous serial channels, a real-time clock, a disk emulator, and a print spooler. Together with its high quality, the PDI464 offers a price-performance ratio that is tough to beat.

The memory section of the PDI464 provides up to 256KB of fully socketed expansion memory with parity generation and checking. Four memory sizes are available from 64 up to 256KB to meet a variety of needs. Regardless of memory size ordered, each PDI464 is tested with a full compliment of 256KB of memory to ensure trouble-free future expansion. Disk-based memory diagnostics are included which can test memory integrity and report problems down to the chip level.

Two asynchronous serial channels are provided which are completely compatible with IBM serial channels. Each channel can be selected to reside at one of four addresses to allow for future expansion. A unique feature is provided which allows simple selection of data terminal or data communication equipment [DTE/DCE] configurations, thus eliminating the need for special cables or null modems. Each channel comes complete with a 6 foot RS-232 cable.

The Real-Time Clock section features quartz-crystal control and lithium battery back-up to ensure years of trouble-free operation. The RTC features hours, minutes, seconds, day-of-the-week, date, month, and year with automatic leap year adjustment. Software is provided to initialize system time and date information automatically upon power-up.

p-Disk™, a disk-emulation package provided with the PDI464 allows memory to be treated as an ultra-fast disk drive. p-Disk™ can be configured as a single or double-sided drive and can appear as drive B, C, or D. p-Disk™ does not require modification or patching of the BIOS or DOS files on system diskettes and is fully compatible with IBM software and diagnostics.

A background printer spooler is included with the PDI464 which allows files to be printed on a printer while other software is being used in the foreground. The spooler offers features such as menu-selectable configuration, multiple copies, and upper case options.

Comprehensive documentation is provided with numerous illustrations to simplify installation procedures. All documentation fits neatly into existing 3-ring binders provided with the Personal Computer.

Each PDI464 is "burnt-in" at elevated temperatures and fully tested. Packaging material provides protection from static and mechanical shock during shipment to further ensure reliability. The PDI464 is covered by a one year limited warranty.

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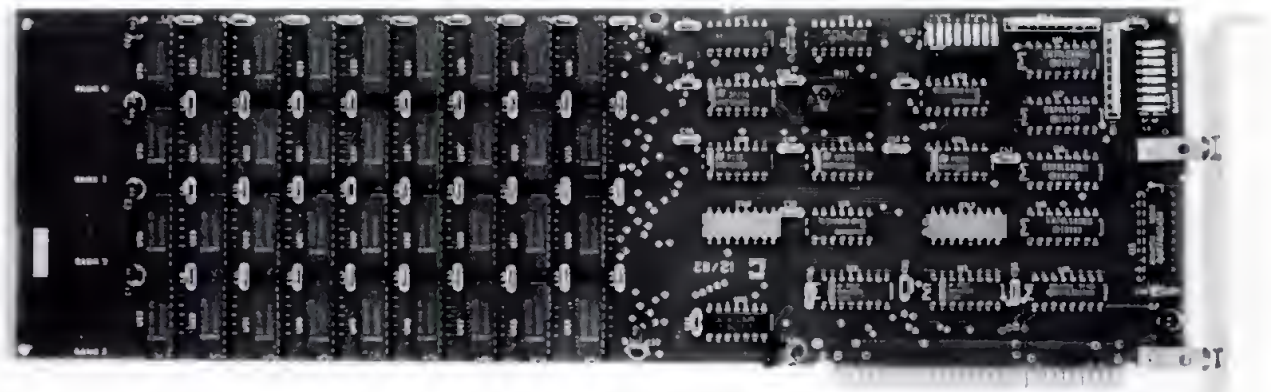
PDI256

256KB Expansion Memory for your IBM Personal Computer.



- ☐ Configured as 4 banks of 64K bytes each
- ☐ Each 64K bank is individually addressable and locatable on 64K byte boundaries
- ☐ On-board parity generation and checking
- ☐ Refresh is synchronized with Planar Memory insuring present and future compatibility
- ☐ Full speed, no wait-states
- ☐ Intel 200 ns ceramic DRams are used throughout
- ☐ Active delay line incorporated for precise refresh
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- ☐ Extensive dynamic testing during burn-in. Available in: 64KB [PDI 256-64];128KB [PDI 256-28]; 192KB [PDI 256-92]; 256KB [PDI 256-56]
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The PDI 256 provides up to 256KB of user memory with parity on a single expansion board for the IBM Personal Computer. Memory is organized as 4-64KB memory banks, each bank can be set to any 64K boundary within the 1 MB address space. Individual memory banks may also be deselected. All address mappings are made by DIP switch settings for easy configuration. All RAM chips are socketed to allow for easy memory add-on or replacement. Memory refresh for PDI series memory boards coincides with the planar board's refresh. No wait-states are required for expansion memory accesses. The PDI 256 is also available in 64, 128 and 192KB versions which are easily upgraded in 64K steps to a maximum capacity of 256KB.

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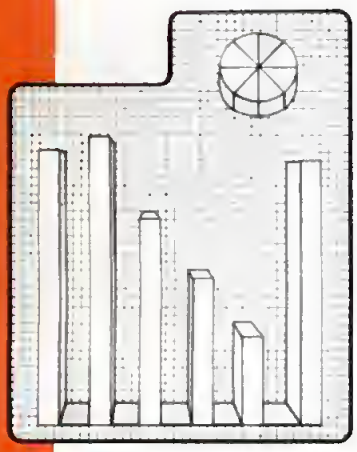

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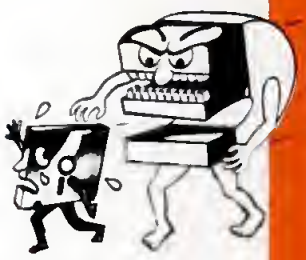

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There's no question that databases are useful tools for storing and retrieving information. Thousands of professionals use databases to monitor inventory, manage mail lists, record fixed assets, and keep track of personnel records.

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Why is that so important? Because experienced users know how many aggravating hours they can waste fixing mistakes that their database should have caught.

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And then we added an embedded calculator that automatically computes taxes and commissions. It even accepts credits and debits against balances due.

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Write or call for your free brochure, "How To Keep Errors Out Of A Database." See for yourself what data checking can do to save you time and aggravation. Write to:

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For Use With IBM PC and APPLE II

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UTILITIES/DONA Z. MEILACH

If, like most PC users, you are often frustrated and confused by the limitations of DOS file names, you'll be glad to know about this handy utility.

SimpliFile Takes The Mystery Out Of File Names

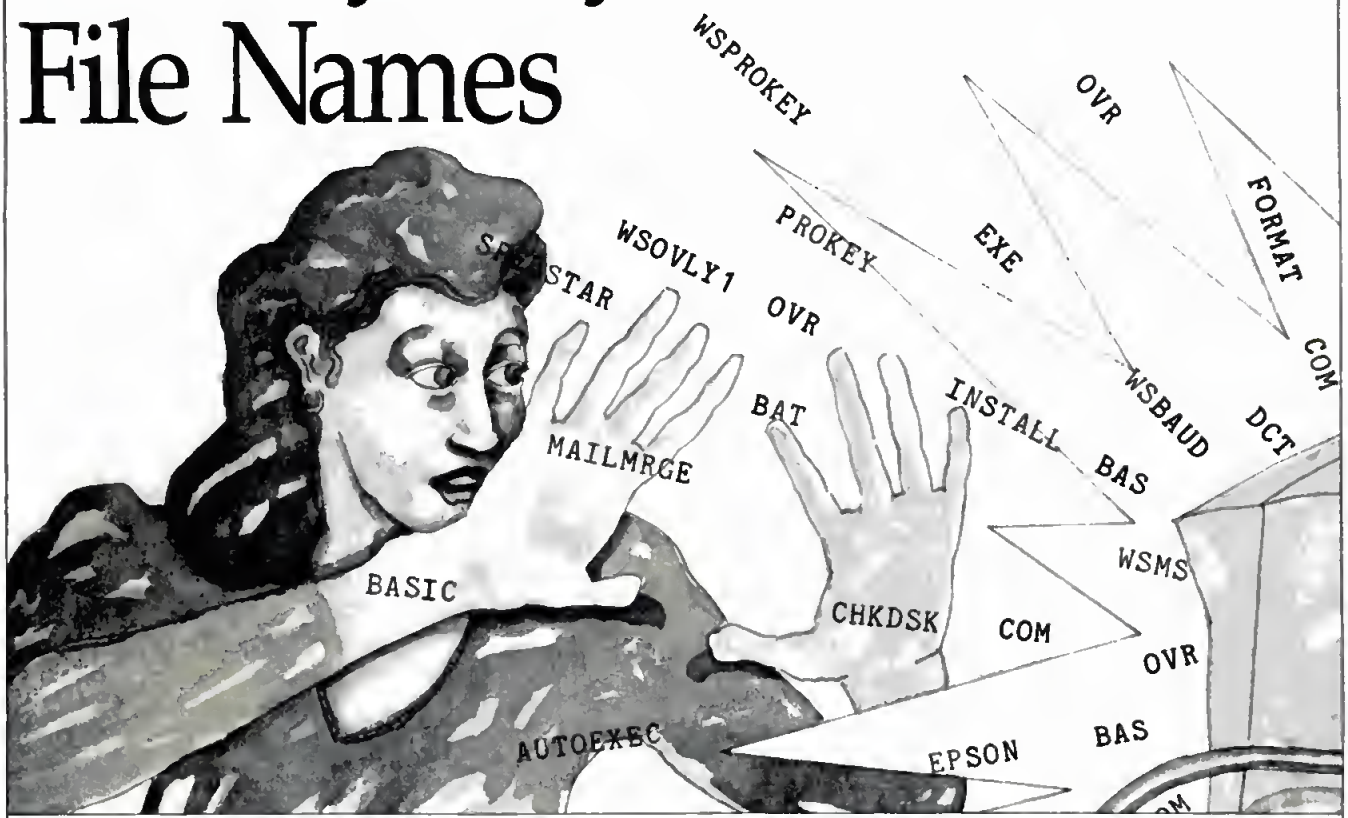

Illustration: Michael Donato

SimpliFile
Durant Software
2532 Durant Ave., Ste 250
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(415) 540-0912
List Price: $100

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Welcoma to the world of electronic filing. Whether you've filled up half a disk, tan disks, or a megabyte of hard disk space, you know that thosa cryptic "eight plus three" character identities for files can become as inscrutable as a sphinx. If there hava been perplexing momants that made you long for the days of the metal file cabinat, don't daspair. Help is on the way.

A program called Simplifile makes it easier than ever to manage filas on your computer. You can instantly locata a specific file in a long list of weirdly named filas, than viaw its contants immediately with tha stroka of a key.

Identify Files and Then Some

With *SimpliFile*, maintaining, identifying and recalling filas becomes almost effortless. Why? Because you can describe each file with a typed line of up to 42 characters. Think of it as putting a cap-

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tion under a photo. You can also peek into that file before you decide whet you want to do with it. The program cuts through the procedures and jargon of DOS utilities so you can copy, back up, erase, rename and dete files.

Can you envision what this might do for your specific spplications? A physician might mark a file for a specific ailment or necessary update. A cook could identify recipes. A salesparson might note future followups to e customer. An inventory file could be identified with the product being stored. The uses are limited only by your own ingenuity.

Consider e usual file titla of eight characters followed by e period end three more charecters (DJONESEX.LET). What happens when you look at thet two months after you wrote it? It's anyone's guess. Now imagine if, when you call up e list of all the files on your disk, eech file had a reveeling identity (see Figure 1).

Now, insteed of trying to figure out what the file name meens, you cen read a short description of the file and have the date handy es well. But beyond identity—perhaps you forgot the color or number of the fabric. Type e V ln front of the filename and the actuel correspondence replaces the Simplifile listing! You can instantly read that letter or the billing. You can scroll it as slowly as you like, or take e quick peek, put it beck in its plece with a touch of the Escape key, and then return to Simpli*File*.

If Simplifile did only this, it would be well worth its $100 price teg. But it does much, much more to take the toil out of file management. It works smoothly (almost transparently when you're used to it) whether you heve e single disk drive with a small capecity, double drive with large capacity, or a hard disk.

The Disk Area Simplifies Life

SimpliFile is installed on the disk as two command files: SF.BAT end SFX.EXE. Turn on the computer, invoke SF et the A> prompt and the Simplifila

MAINTAINING, identifying and recalling files becomes almost effortless.

logo eppeers only long enough to load the program and find the files. When this is completed your screen takes on an organization (see Figure 2).

The top portion ebove the horizontal lines is the Disk Aree. The bottom portion is the File Aree. An eesy trip through the menuel expleins whet the words mean snd how to use them. All cursor movements involva either the ascape, return, or arrow keys; you type only your own descriptions.

When the program appears, the cursor is on the date in the Disk Aree end e disk message esks if you want to chenge it. The cursor then jumps down to tha files. Using either the return key or arrow keys

Figure 1: Example of two files listed by SimpliFile.

```
=> DJONESEX.LET | 3K | 013083 | Doris Jones sent example chair fabric
   DJONESAC.BIL | 1K | 021883 | Accepted. Billed. Rebill 031583
```

Figure 2: Screen orgonization of the SimpliFile *program.*

```
 * SIMPLIFILE *   | Sort   Mult      | Current:A Backup:B Date: 012583
Space Left: 128K  | Exit   FLst      |                        DiekID: -1LETR
Row:  3 of  25    |           Help   | (Diek meesage area----------)
------------------|------------------:-------------------------------------
CMD  Nama   Typ   | Size :Chgdte     : Description
------------------:------:-----------|-------------------------------------
    —11tr   DID   : 2K   :012583     : Simplifile identification no.
    GENLMOT MCD   : 5K   :120782     : Complaint car Mcdonald/Pres.GM
 => MCGRATH1 LET  : 3K   :121082     : Bid on artwork/ad campaign
    MCGRATH2 LET  : 2K   :010983     : FOLLOW UP-additional info sent
  etc.
```

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you can quickly scan the list, plece the cursor in front of the selected file, and hit the key necessary to perform the desired commands.

Other vital information is offered in the disk area. The left portion explains the number of bytes remaining on the disk. "Row" indicates the position of the cursor in the file list and the totel number of files on thet disk. (Would you ever know how many folders you hed in e file drewer?)

AN EASY trip through the manual explains what the words mean and how to use them.

The words and abbreviations in the central panel do not remein mysterious for long. Plece your cursor in front of >Sort end a short listing appears in the message area that asks how you went your files sorted.

```
>>Sort: >Name Type Size
```

Move the cursor, with the arrow key, to >Neme end the file will list alphebeticelly; to >Type and you can group all files ending with "LET" or "BIL" or by whatever code you decide will help you organize them; to >Size and they'll be arranged by number of Kbytes with tbe largest at the top.

MULT stands for multiple, a fecility that enables you to backup, list, or erase severel files et one time. It's similar to the wild card functions in DOS for copying or erasing files, but it performs them much more efficiently and selectively. You can handle files of different types at one time for en erese or backup—not just .COM files or those beginning with a similer syllable.

FLst prints out the file list so you can tuck the hard copy into the disk envelope for quick reference to the files on thet disk. It can be printed in eny of the orders in which they were sorted, too. No more wondering which disk contains which files. You can easily compare the files on two disks because the list is printed in a

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single column.

HELP is one way of discovering all the commands you need. You can also reach it by hitting a ? whenever you are in the file area.

What's in the right hand panel? You're told which disk drive is currently logged and which is the backup disk. Want to switch drives? Escape returns the cursor back to the disk area, the arrow key directs the cursor to >Current, and a disk message asks which drive you want for what. Enter the drive letter, press return, and you're done.

The Date key allows you to input the last time you used a disk or a file. The program will integrate with the IBM PC date facility and give you the option to use either the built-in date command or the Simpli*File* one.

DiskID: means disk identification. A name for each disk is required by Simplifile. The disk identification will appear first in the file list with a — preceding it and a .DID following it.

The File Listing

The headings between the horizontal lines are self-explanatory, with the exception perhaps of CMD, an abbreviation for command. This is the column where you place the cursor, point to a file, and indicate what you want to do with it. The alternatives appear by invoking Help or the ? key for the Help menu.

THE RETURN key will move the cursor down the command line, the up-arrow keys will reverse it.

The Help menu provides two sets of commands (see Figure 3). The left side is for the Disk area already discussed. The right side summarizes the variety of tasks you can perform by hitting one letter only (no clumsy operating system lines in which one tiny error will thwart all your good intentions).

One can never fully appreciate the

Figure 3: The SimpliFile Help menu.

```
**DISK COMMANDS**                **FILE COMMANDS**
Sort    = Sort Filenames         ? = Command Summary
Mult    = Bkup, List, Erase      B = Backup File
Current = Current Drive          C = Copy file
Backup  = Backup Drive           E = Erase file
Date    = Today's Date           L = List file
Exit    = Exit Simplifile        M = Multiple file
FLst    = List Filenames         N = Next screen
DiskId  = Identify Disk          P = Previous screen
Help    = Command Summary        R = Rename file
                                 T = Make this top row
                                 V = View file
     **MISC Commands**           X = Execute program

<ESC>   = Escape from action,
  or where you are.
```

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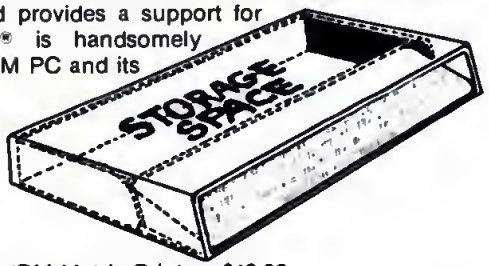

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machinations in a program and its potentials until it has been used several times.

A FEW OF the deck directions were fuzzy.

But commands such as N (Next Screen) and P (Previous Screen) permit you to run up and down a long list of file names like a kitten on a keyboard. No more will you have to contend with a directory listing that disappears from sight into the top of your screen and can only be retrieved by hitting "dir" again. A T placed before any file immediately gives it top row billing on the screen so you can view any nineteen lines at a time.

The return key will move the cursor down the command line; the up-arrow keys will reverse it. Arrow right will position the cursor in the data and description columns, and the return key will put it back in the command line. Your left hand little finger will be kept busy on the escape key, which juggles the cursor back and forth from the disk area to the file area. The escape key also cancels any previous command.

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You'll understand how carefully the program is constructed when you discover that you can enter directly into your most often-used programs without going in and out of DOS. If you frequently use WordStar, dBASE II, or another program, it can be installed through the PROGLIST command. Place the cursor in front of the program and hit X for Execute to begin a work session. When you're through, the program's usual exit command will return you to Simplifile so you can update all files used and give them a description.

Should you wish to perform other file cleanup or organization, here's how some of the commands perform:

The Copy command (C) only copies files to the same disk. The Backup command (B) puts them on the backup disk. Performing tasks on multiple files with different names and extensions in one stroke is a decided advantage over the commands in DOS. Place an M (for multiple) in front of every file on which you want to perform the same activity, such as erase, list, or backup; then place the cursor on MULT in the disk area and it's all done.

YOU CAN handle files of different types at one time for an erase or backup.

An L (for List) will print out a file with a number in front of each line. It's a bonus for those who require copy editing or line-by-line reference for a program.

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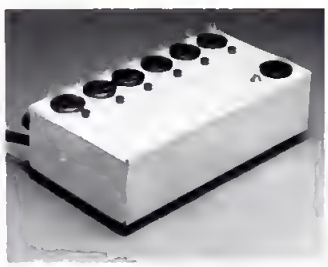

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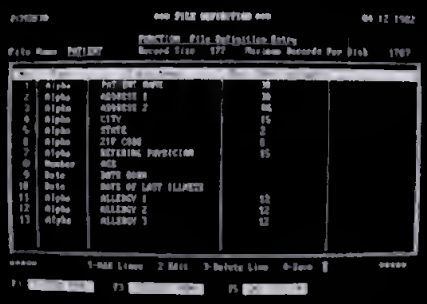

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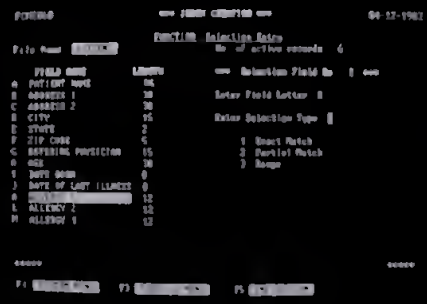

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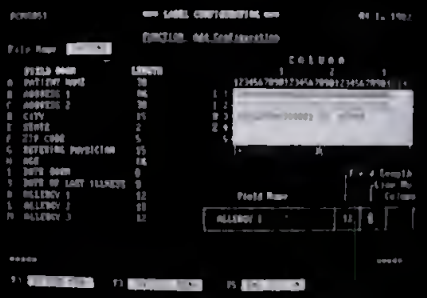

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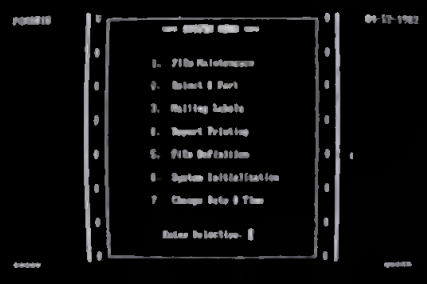

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gram for command practice. Just follow the manuel as it introduces each utility for backing up files, eresing them, copying them, renaming them, end viewing them. It takes e little time to understand it all, so don't be impetient.

Practical Aspects

If you heve ample spece, each disk should have e *SimpliFile* program residing on it. Then, et the end of e session, you can update and identify files while their contents are fresh in your mind. (If you forget whet you wrote, just cell up view.) If you heve limited disk space, the system works with a disk-swepping technique thet is eesy end prectical. *SimpliFile* is eveileble in other 5-1/4- inch and 8-inch CP/M formets.

IT'S NICE to see software that sweeps away confusion.

Documentation

The 38-pege photocopied manuel ls clean and direct, with e teble of contents, index, and emple descriptions of each aspect of the program. A few of the directions were fuzzy when l worked the program, but telephone calls to the company and the euthor quickly clarified the problem. A promise to send e revised pege of the directions wes fulfilled by the next dey's meil. By the time you reed this, the menuel should be unquestioningly clear. The eppendix lists messeges thet can appear on the terminal.

Author, Author

It's nice to see software thet sweeps ewey confusion end helps the user handle files effectively and efficiently. Credit for Simplifile must go to euthor Randy Nielsen of Durant Software. Randy's inspiretion derived from his mainframe experience as a data processing maneger for en investment manegement company, where it wes essentiel to meke computers eesy to use for lerge numbers of employees. His goel? To continue writing straightforward programs to simplify the use of computers.

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Dono Z. Meilach is the author of the just releosed Before You Buy a Computer (Crown Publishers) in oddition to 65 other books on o variety of subjects.

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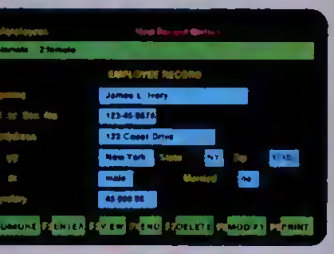

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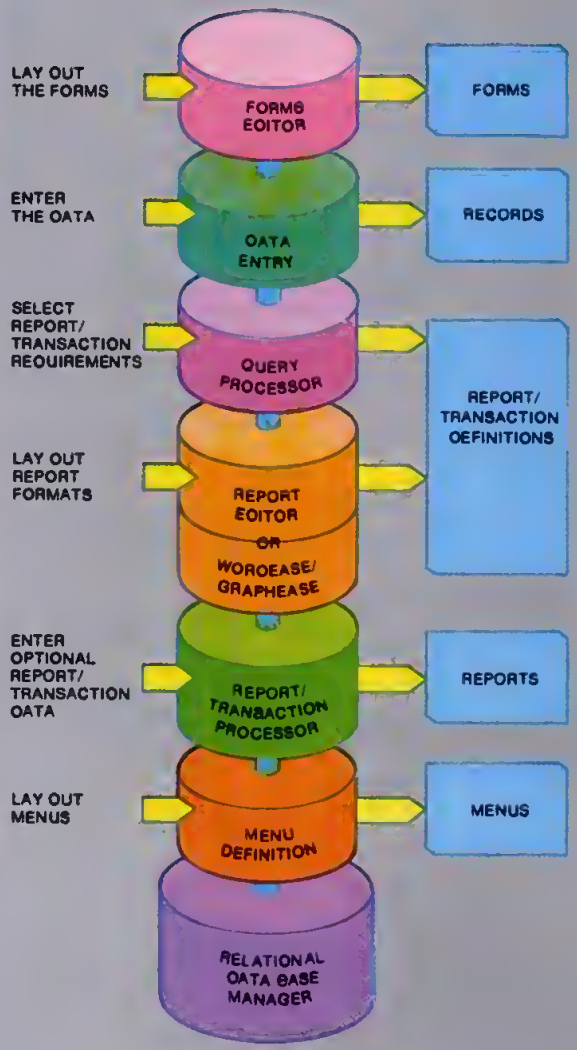

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Selling PCs in Sydney isn't quite the same as selling them in Seattle—as IBM discovered when it went Down Under.

Tie Me IBM Down, Boys

The way Arnold Roth talls it, they're rejoicing from Wagga Wagga to the shores of Shark Bay. Shlps that onca deposited cargoes of axiled prisoners and na'er-do-wells onto Australian docks are now offloading cretes filled with newly minted PCs.

IBM has finally taken its small systems all the way around tha globa. If you wara to drill a hole through the center of tha earth starting at Boca Raton you would emerge a short ride from Roth's Malbourna offica. Roth plans to distribute software and peripherals for the IBM PC and other IBM small systems in Australia and New Zealand. During a recent buying trlp to New York he spoke with the aditors of PC about the opportunities and problems in selling PC products Down Under.

Selling and Support

The PC is very new to Australia—it was released the first week of February 1983. Roth beliavas computers will not be markated tha way they are in America, "whare thay're sold in photo stores." According to Roth, "the typical purchasar is going to want a great daal of support and a great deal of explanation. And he'll need a great deal of persuasion before he makes tha decision to walk in your door. Our approach is to sell from within business."

Roth's Software Corporation of Australia is setting up shop in Melbourne but has agents throughout Australia. Melbourna is the corporate center of the country, the financial heart, where most businesses get startad. Roth calls it "the Lower East Sida of the South Pacific." Ha claims no one else is doing what he does. "Thare are a lot of people entaring the markat who ara basically jumped-up mail-ordar merchants. There is nobody approaching this from tha point of view of 'here is a business solution—come to us if you want it.' "

"Most of the peopla now selling say, 'wall it's got whistles and bells and 64 woofers per channel.' You can even see it in the advertisements." His approach is completely different. Roth is a lawyer specializing in financial matters, and works closely with former managament consultant and systems expert Jim Landau. They, along with another attornay, Michaal Warren, approach potantial customers by telling tham thay undarstand what an inventory problem is, or how to automate their financial analyses and record keeping.

Australia is not as affluent as the

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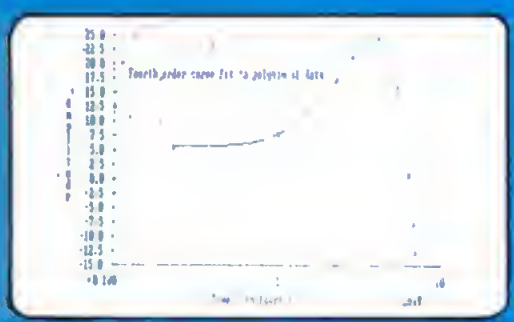

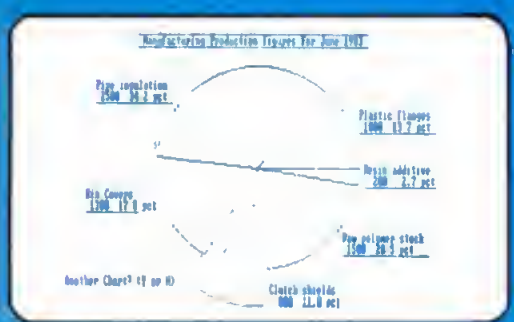

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United Stetes. People have far less discretionery income. As a result, businesses will be the sole purchasers of PCs, at leest at the outset. The idea of buying a PC for your living room is still a long way off.

Computer Illiteracy

According to Roth, the Australian markat is assentially computar-illitarata. "I've found just telking to everege people in Amarica—taxi drivers for instanca—that everybody knows what a computer is. They know what 64K RAM constitutas, thay know whet a daisy whaal is, thay know tha basics. In Australia, tha image of computers is much like thet in the Danny Kaye movia, The Mon From the Diners Club, with punchcards flying all ovar the place."

"Nobody's been pushing the idea of computers to the everege men in tha street. Businass menagars know what computers cen do. They're familiar with mainframes and minis—PDPs are all over the plece in Austrelie. But the man in the street has no direct involvamant in it—and if you think back to 5 or 8 yaars ago in Amarica, tha same wes generally true." Tha PC II is on the verge of coming out in tha Unitad States, but "in Austrelie they don't even went to know ebout it. Austrelia is really a backwater from a certain point of view, end business is often done in e backweter kind of wey. That's not to say that there aren't highly-driven paople who know what they're doing—and we went to telk to them."

Roth is interested in seeing what will happen when competitive systams begin going head-to-haad with IBM. Coinciding with the IBM leunch, DEC is spanding "enormous volumes of money in Australia—thay triad to come out of that sort of hazy technical imege that thay have, to become a desktop-type company." DEC started their promotional campaign three days bafore IBM announcad its PC. Tandy/Radio Shack is franchised throughout Australie, end Atari is selling quita well. There are evan some products in Australia that Roth claims "will nevar see the light of day in tha Unitad Stetes, such as the Hitachi Peach, a very versatile little packaga, which is very successful in Australia."

The IBM Approach

IBM has what Roth cells "an amezing imege—all their people wear whita shirts in Australia. It's a vary Amarican compeny—meny of their amployees are either American or hava spent long periods of time in tha United States. IBM is run lika en Amarican company and they hava anormous problems in communicating to Australian business," Roth explained. "That's tha reason IBM has not baan as successful in Austrelie—the IBM epproach is assantially the white shirt-blua suit-Wall Street approach. It doesn't understend thet Austrelie is leid-back-California style."

"Professionelism is very important," Roth expleined. "But Austreliens ere more concerned thet someone else hes made all the mistekes, dona all the pionaaring, gotten rid of all tha bugs and heedeches. When they get the PC, all they want to know is that they cen turn it on and it runs. Contrery to the American imege, there ere no pioneers in Australia."

OUR APPROACH is to sell from within business.

Poor Support

When Roth's law firm bought its first Displeywriter about two yaars ego he immadiately noticad that paopla in his office felt "esseulted" by the complex IBM operating codes and the "whola litany of elphebetized titles." Most users simply shrugged end told him "Ah, wall, that's IBM—they just don't speak to Australia." People there don't want to ba told things in Medison Avenua tarms, Roth axplained, and they're innately suspicious. "IBM doasn't understend thet. They simply replicated the American axparience in Australia . . . and tha support we get from IBM is very poor." He edds thet whila ha hes a "very heppy relationship with IBM," he objacts to the way it markets its products without regard to the Austrelian point of viaw.

Roth first bacama intarestad in Displeywriters 2 years ago whan visiting this country. "We ware running into a paper-shuffling problem in our office becausa we ware just sterting up. It cost only around $8,000 so when I went back to Australia wa dacided to buy a Displaywriter. Wa spant $17,000 end got exactly whet wa thought we were going to get for $8,000. But we were delighted with it." Roth is an unquelified fan of the Displaywriter. In fact ha's on the officiel IBM lecture circuit in Australia, and spaaks on IBM's behalf. After working extansively with tha Displeywriter he begen looking et the PC. He admits he was elso attractad to it bacause tha PC "was causing a revolution."

While Roth questions IBM's marketing tachniquas, he feals IBM's imaga should halp the PC's seles. Becausa of the IBM lebal, customers "feel they're going to get support and that tha products will keap pace with new developments. Thet's a vary critical concarn in Australia, because we're e young, devaloping country, whare things grow and grow quickly." Decisions on which brend of micro to buy will, ha says, be mada on the besis of what tha purchaser's company will be doing three years down tha road and whether the computer will be abla to keep up.

IBM is vary consarvativa ebout projectad seles thera. Roth hes heard that it hopes to sell about 5,000 PCs this year—but IBM wes similarly conservetiva about PC salas in tha Unitad Statas early on. Howevar, the retail stores are budgeting on tha assumption that thay will be sallIng two mechines per day per shop. And with epproximetely 50 to 60 stores selling 200 days each yaer that comas to at laast four timas IBM's estimate. According to Roth, more than 300,000 personal computers will be sold in Australia between 1982 and 1985.

IBM currently operates one store of its own, plus "e very smell sales group," to serve corporate cliants. This group hes little or no contact with the rest of IBM in Australia according to Roth. "They're set up as e saparata unit; they're autonomous, and in fact they appaar to activaly discouraga their amployees from having any involvement with the IBM PC."

Educating the Public

Roth feels the market will grow considerebly, sinca IBM, DEC and others are "spending untold amounts in educating the public." Ha also believas that busi-

ness-oriantad software, such es inventory-control packages and spreedsheets should do very well in the Australian market end thet the country is "reedy for e good word processing program even though there are so many availeble." To his astonishment, IBM has "ignored reality" and is offering the much-maligned early varsion of *EosyWriter 1.0*.

Ha also admits ha is going to heva an "intaresting marketing chellenge" when tha PC II is released. "IBM hes only just announcad the PC, and they're not about to relaase PC II in Austraiia for a year or two. In tha meantima Australians wiil be reading in American magazines how much bettar the PC II is compared to tha PC—perhaps IBM thinks that Australia is more insular then it reelly is. What iimited information peopla get about computers comes mainly from American periodicals. Thay buy Australian megezines only to learn who's selling what. If you want to know what's happaning in the world you get an eirmeil adition of *Byte* or *PC*."

The Cultural Gap

Amarican end Austrelian versions of the same IBM software packages are not identicel. Text processors come with what is called a UK spelling module. Spreadsheets are elso different. Australiens write dates with the dey preceding tha month and year. Aithough the unit of currency is the dollar, Roth has frequently hed Austrelian checks returnad by Americen banks beceuse they thought he hed postdeted them.

> *THE SUPPORT we get from IBM is very poor.*

Roth feels that many of tha customizations IBM has mada are cosmetic. Whiia it chenged "color" on its seles literature to "colour," it used the photogreph from its Americen brochure of a fethar and deughter fiddiing with a PC in thair living room—something few Australiens would find appropriete. Roth calls this IBM's "blind spot," insisting that "paople really do iook et tha world differently in Australie; they certeinly do business in a different way. They're much more British, more courtly and genteel."

Afraid of the Unknown

"Tha Australian system works very much on tha buddy-buddy system," Roth seid. "Telent mey or may not heve much to do with your prospects of success. That's an English approach to doing businass, e fer cry from the Amarican wey of doing things. As a result you've got many people in middle end upper managament levels who are basically dodos. If you're going to confront them with tha challange of putting e computer on their desks—or worse stiil, on the desk of tha guy immediately balow tham, you're going to creata disruption and tensions. So far nobody's eddressing thet in thair advartising. No-

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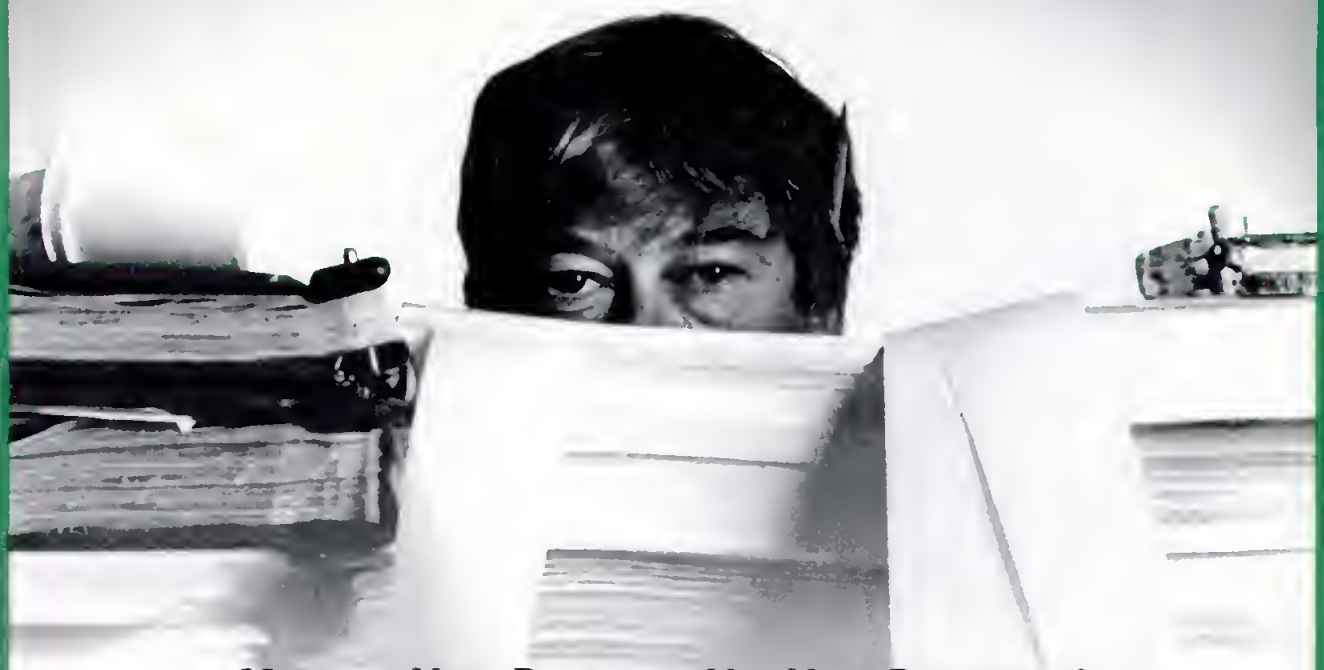

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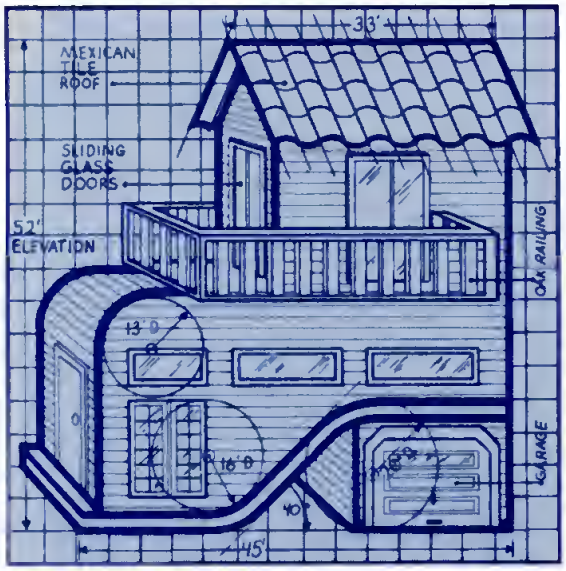

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body's coming to terms with the idea that people are reelly quite afraid of the unknown in business."

Roth first got en inkling of how IBM operated when he shopped for software for his new Displaywriter. "We can't buy UCSD Pascel. They will not tell you that CP/M-86 is eveileble on the Displaywriter. They will tell you ebsolutely nothing. They will try to sell you e System 23 if you heve en accounting problem—they've done it to us. In fect, e month before they releesed the Displaywriter they wanted to sell us e meg-card system. It's e funny thing—they try to engender loyelty, they went you to be en IBM house. IBM is big on loyelty," Roth added, "but they use you."

Perheps es a result of such complaints, IBM recently reorgenized its entire Australian operetion. According to Roth, IBM now edmits they effectively lost two years. Before this chenge IBM groups were competing with one another for the seme accounts end were ectually "breaking each other's neck—even on price."

The Australian Experience

"Meny smell systems menufecturers ere meking similer mistekes," he told PC. "They see en ed in an American magazine, get the rights to e product and reproduce the exect same ed in an Australian magazine. But more often than not they fall flat on their faces. The words or tha messege or the level of sophistication just won't transplent." Roth expleins, "They

WE'RE A young, developing country, where things grow and grow quickly.

telk ebout spreedsheets, for example. To most Austrelien businesspeopla, spreedsheets are something you sleep on when you go out into the bush. It just doesn't speek to the Austrelien experienca at all."

Another problem is thet there ere few, if eny, nationel datebeses in Australia. In Americe, physiciens, lawyers, end re-

searchers can tie into large electronic referenca networks. It is easy for them to becoma familiar with tha computars thay use to saarcb for such information. There are many roadblocks to this in Australia. For instanca, tha copyright laws of tha state of Victoria are so knotty that thay won't allow replication of eitber statutes or decided case law. There are even problams gatting thasa things onto papar, much less putting tham on line. Roth reports that tha faderal attorney genaral just announced that ha's going to have a fresh look at this situation. As it now stands, avary law firm has to hava its own library and there is no opportunity to create a cantral legal databasa.

Fragmented Markets

Tha Australian word processing markat is vary fragmantad. There are many vendors and saamingly few takers, apart from perhaps tha few top law firms. Roth cleims he has had succass talking to lawyers about computers in terms of function, by saying, "Here are the kinds of things you can do." Ha contrasts this with the approach usad by companies like IBM, Lanier, or Wang, who "are not oriented towards discussing tha problem in terms of its function. They'll give you advanced managament studies that say how much faster it is to produce e latter on a word procassor."

"And it's all jargon because tha vary first time you hava tha system in your office you discover that it may taka your secretary a vary short time to key it in but it takes a considarebly longar time to put tha pepar into tha feedar—unless you have an automatic sheet feeder, and nobody telkad to you about that."

Roth is particularly intarested in communications to host meinframe computers and the kinds of manu-drivan operating systams just coming on tha markat in tha United Statas. Australian executives in large corporations have worked with mainframa computars for years and understand how valuabla thay can be. But they don't want to learn tha arcana command languega needed to run tham. They would lika nothing better than to use a PC to celculata bond redamption yialds, or discount treasury notas, then compsre tha two by producing a graph of the results. But they want to be ebla to do it at tha touch of a button or two.

Ha is also looking into talecommunication equipmant, becausa networking is so important to Australian businass. "Wa are a disparsad businass community. Thera's 580 miles batween tha two closast major financial canters." His company is exploring local networking, end communications with the PC as e tarmlnal for a cantral host computar. "Our primary interest is in gatting tha PC to talk to Systam 38s and 34s. And wa'd also like it to do long-distance communications—either through the dial-up natwork or some sort of laesad-lina arrangament."

The Growth Areas

Madical practicas also reprasant vary good markating prospects in Australia.

PEOPLE really do look at the world differently in Australia.

Doctors are very aware of tax deductions for office computer systems. However, many Australian doctors are clinicians—who build up casa histories, talk to their patients et lengtb, and prefer extensive parsonal contact to high-technology tools.

Medical practices are run on a mucb smallar scala in Australia than in tha United Statas. Thare ara many clinics in America whare different specialists work together with diagnosticians. In Australla, howavar, tha avarage practitionar runs e small, country-doctor-style operation. It's a cash business; the petiant comas in, puts his $15 down, and gats a consultation.

Roth feels that salling such physicians computars would ba doing tham a disservice. Normally medical practitionars could use a computer system that would giva tham control over thair dabtors—but in most ceses thare are no debtors. And many would be wary of purchasing a computer es a diagnostic tool. The lergar clinical practicas, on the other band, are dafinitaly a good markat for computars.

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in the category of "practice menegement." It wouldn't be difficult, Roth contends, to create a standerd set of processes that would menege most professionel businesses. Such e basic peckage would satisfy doctors, dentists, vets, reeltors, and many others.

THERE ARE few, if any, national databases.

Kangaroo Software

Roth has calculeted thet it would probably cost between $50,000 end $60,000 to introduce e perticular piece of software throughout Austrelie. Beceuse of this, he thinks it might be necessery to "reconfigure the merket postures" of certein products. "We may teke three seperete products end cell them ell 'Kengaroo Software,' so thet we creete e 'corporate suite' of software."

All of his efforts will be focused on IBM smell-systems software and peripherals. Why is he hooked on IBM? "IBM seems to be pretty hooked on Austrelie. They heve e better understending of marketing in the abstract sense than anybody else. Cromemco has e greet product, but they don't know how to sell. There are a lot of good products ebout. If you went to find e good system you can find it—but the merket is not filled with people looking for e good system. There is simply e market of people with problems. They mey be open to the suggestion thet you heve en enswer to their problem. Now whether thet enswer is en ebacus or a plug-in computer is e metter of some indifference to them, so long es you cen provide them with the results they went."

Roth is optimistic ebout the future. He feels that some of the upcoming computer shows mey for the first time begin to "communicete the messege of personel computers to the messes." But for now, he is eager to begin selling to the thousands of businessmen end professionals who are discovering the power of the PC./*PC*

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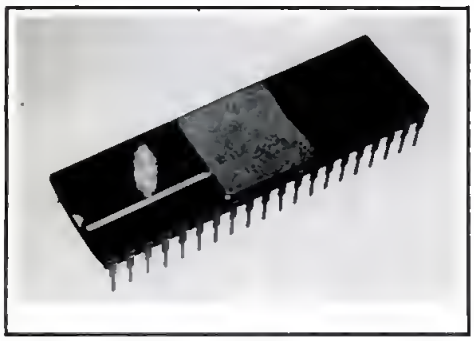

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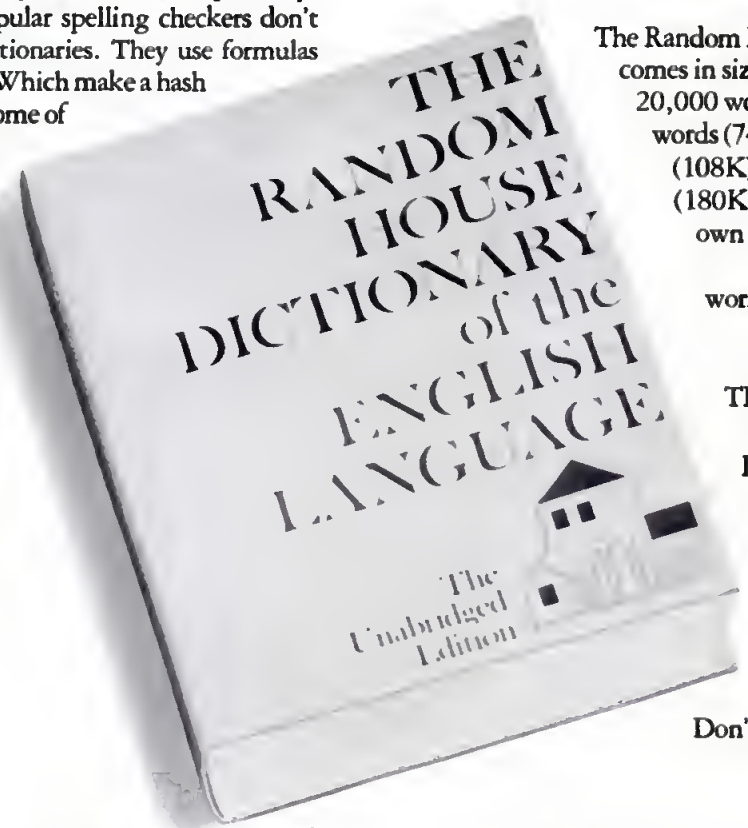

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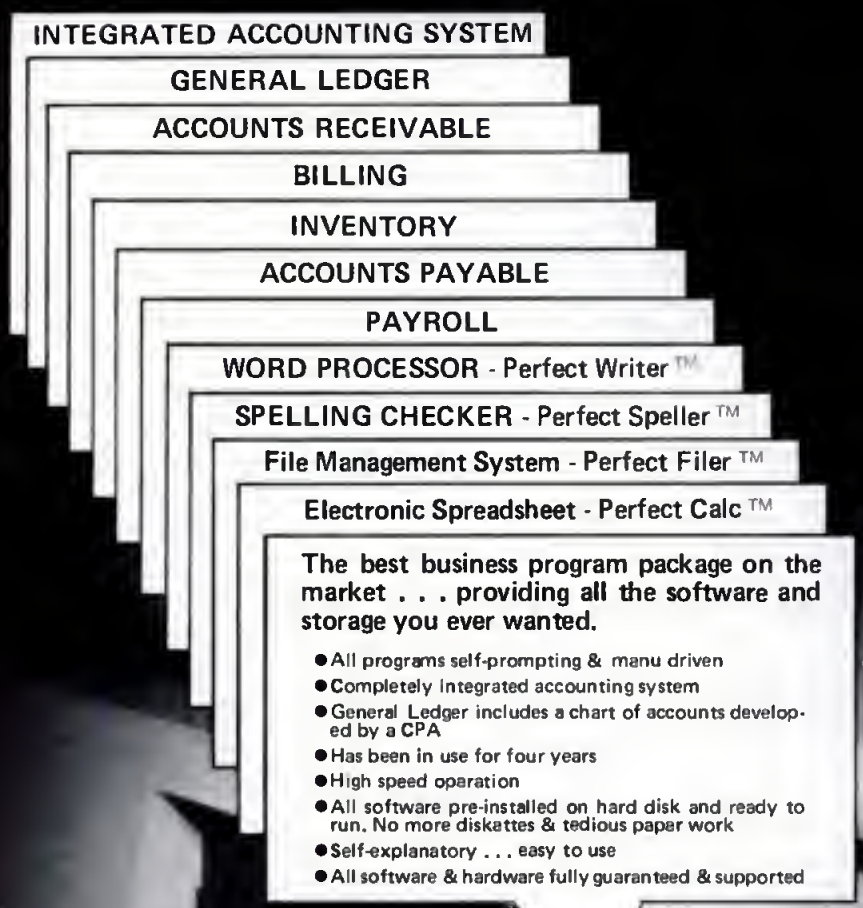

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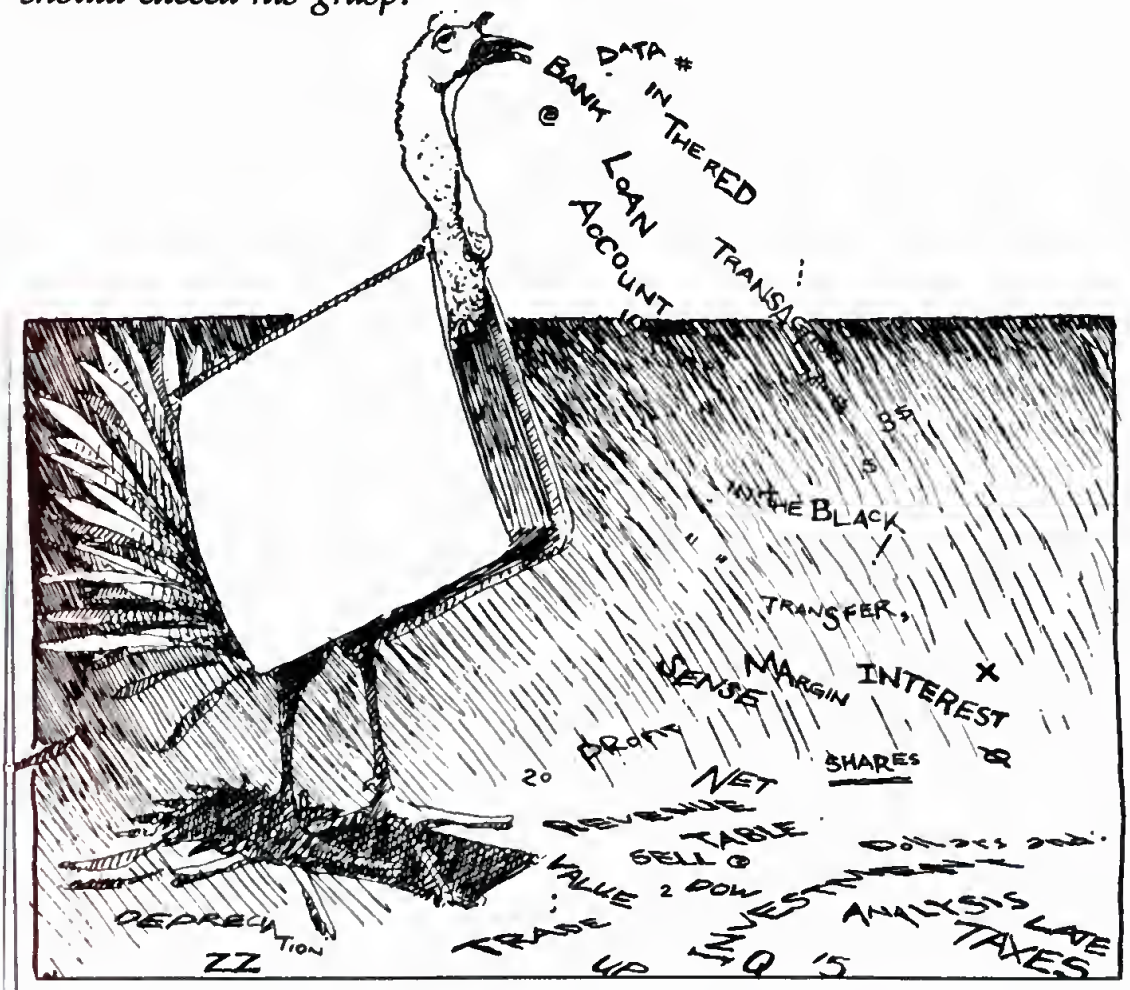
CIRCLE 276 ON READER SERVICE CARD

A trio of earthbound WordStar utilities leads a reviewer to question the old saw that one's reach should exceed his grasp.



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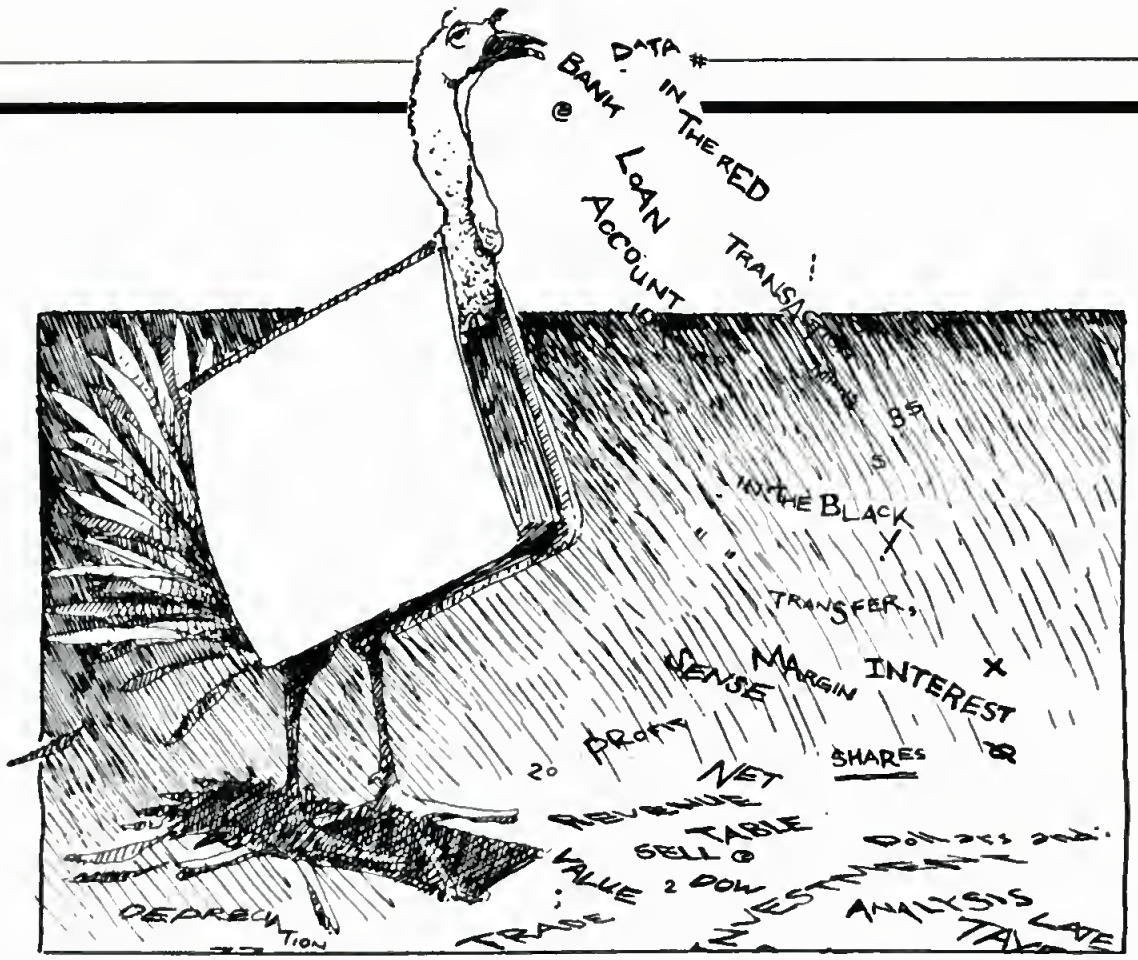
CIRCLE 589 ON READER SERVICE CARD

"Computers," snorted the crusty old guy et the Underwood typewriter, "let you spend 2 weeks figuring out e slick wey to save 5 whole minutes in your entire lifetime."

As someone who can no longer contemplete the dreed thought of writing without e computer, I shrugged Underwood off as just another technophobe. But after whet seems like en eternity with *Footnote*, *Poir*, and *Bibliography*, I begin to see exactly whet the old guy was telking ebout.

Footnote, as the manual says, "numbers and formets calls and notes in WordStor text files." Its companion, *Poir*, checks to see whether commands such as the ones used to begin underlinlng and boldfecing ectually end where they're supposed to, a clever wey of keeping your printer from spitting the last half of a novel beck et you beautifully underlined beceuse you forgot e single Ctrl-S.

Bibliography, sold separetely, "compares cltations in e menuscript with the keynames of entries in a Library file and



constructs e bibliogrephy of all entries cited." We'll explein this leter.

All About *Footnote*

The manuel seys Footnote will run on a 64K PC in either PC-DOS—the version I tested—or CP/M-86. I ren it from DOS and from WordStar's somewhat unpredictable R (run) command.

Footnote formats footnotes in ell sorts of weys. You can print the notes on the same pege as the reference, or you can put them in e separate file. You can even have the program split the footnotes across page breaks when they won't fit on the current page.

You enter notes while working on your text in WordStar, but the procedure lsn't exactly simplicity itself. First you type en @ where you went your reference to appear in the text. Then, to enter a footnote, you lnsert a Ctrl-R (by typing Ctrl-PR), strike the Enter key enough speces to indent your footnote from the mergin, enother @, and your text. Finelly you type another Enter and e .pa commend to terminate the entry.

To save time, you can group footnotes between any single Ctrl-R and .pa pair. The notes can be entered anywhere in the text, provided they follow the references to them and eppear in the proper order. But since you don't enter any footnote numbers—only @ signs—keeping treck of which note goes with which reference cen be confusing.

The procedure causes some occasionally unpleesant surprises. Since the .pe command is whet WordStor uses for e page break, the first Footnote .pe command renders the WordStor page break display end pege-count functions useless. You can ignore them or shut them off, but it might be smarter to devise e routine to postpone the insertion of the .pe commends until just before running Footnote. If you want to specify conditional or mandetory pege breaks, you must insert an extre dot in front of the traditional WordStar .cp and .pe commands.

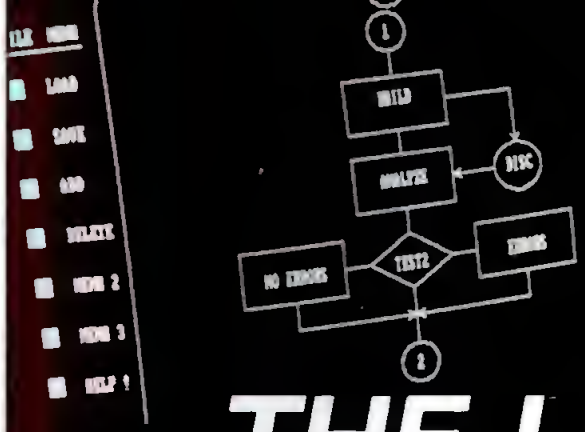
Once you've peppered your text with @ signs and Ctrl-R's and footnotes end .pa commends, you're reedy to call up Footnote by typing FN. The Footnote files must be on the logged disk drive or on a drive A.

A Menu of Options

Footnote displeys a menu of five options, one of which is to exit the program. You begin with 1 (or N) to Number the notes. After you enter the file name and starting note number, Footnote goes through your file, peirs up the references

THE PROCEDURE causes some occasionally unpleasant surprises.

THE MANUAL has no IBM-specific information at all.



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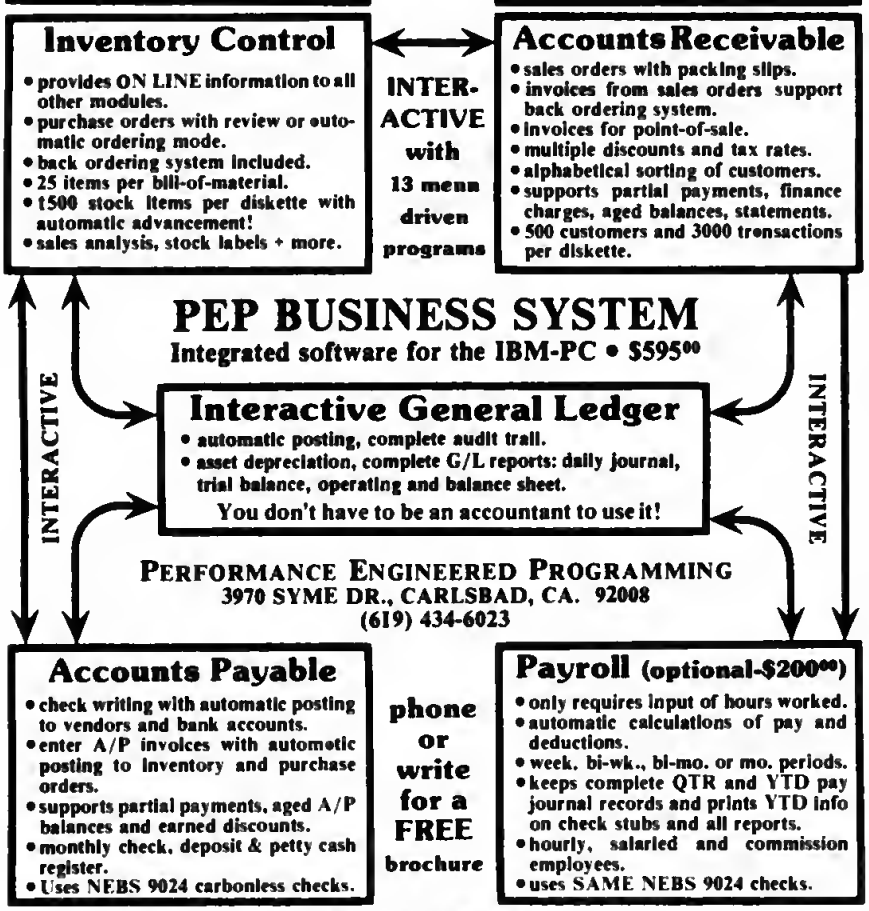

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and notes, numbers them, inserts WordStar control characters so that the numbers will be properly superscripted or underlined, and edds some special control characters of its own: Ctrl-E, Ctrl-Y, and Ctrl-R by defeult, though you can change these. It also renames the original version of the file as (FILENAME).BAK, just in case there are problems, which there might well be.

The omission of one Ctrl-R or one .pa or one @ sign will generete some sort of error message. Your chalienge is to go back into the numbered file and try to figure out where you goofed. This may not be easy. For example, If you've omitted one @, Footnote will likely heve mispaired ell your subsequent references end notes. Fortuneteiy, once you make the omitted insertion, you won't have to renumber them — Footnote will do thet for you next time you run the Number function. If you do everything right.

Once you get through Number successfuiiy, you seiect the Formet option. This time Footnote goes through your text and reformats ell your peges, sticking the footnotes et the bottom of the peges where they're referenced. It elso renames the Numbered fiie as (FILENAME).BAK, thereby oblitereting your originai file completeiy. To be on the safe side, I'd copy my precious text file to e different

YOUR CHALLENGE is to go back into the numbered file and try to figure out where you goofed. This may not be easy.

file name before entrusting it to Footnote.

Format is not exactly a speed demon. It took about 2 minutes to go through a five-page document with 17 footnotes, even with the 192K of memory I have available, because the program does e lot of writing to disk. It can elso do odd things like discard the last line of your text if you forget to follow it with en Enter. But what it gives you is certainly impressive: e new

WordStar document ready for printing, with all the footnotes on the bottoms of the proper pages.

Stacking Footnotes at the End

If you prefer to put the footnotes et the end of the text, you run the Remove option instead of Format. You specify the name of an auxiliary file for the notes, and Footnote will yenk them from your file and put them there. Then you can read them into the end of your text file. If you want the separate file of notes Inserted back underneath the text, you select the finel option on the menu (Merge) and Footnote will reconstruct a document with notes at the page bottoms.

Now, ell this sounds pretty nifty, and it is. Unfortunetely, it took me e whole working day to begin to learn how to do it. The program isn't exactly hospitable, and, to put it politely, the documentetion is worse.

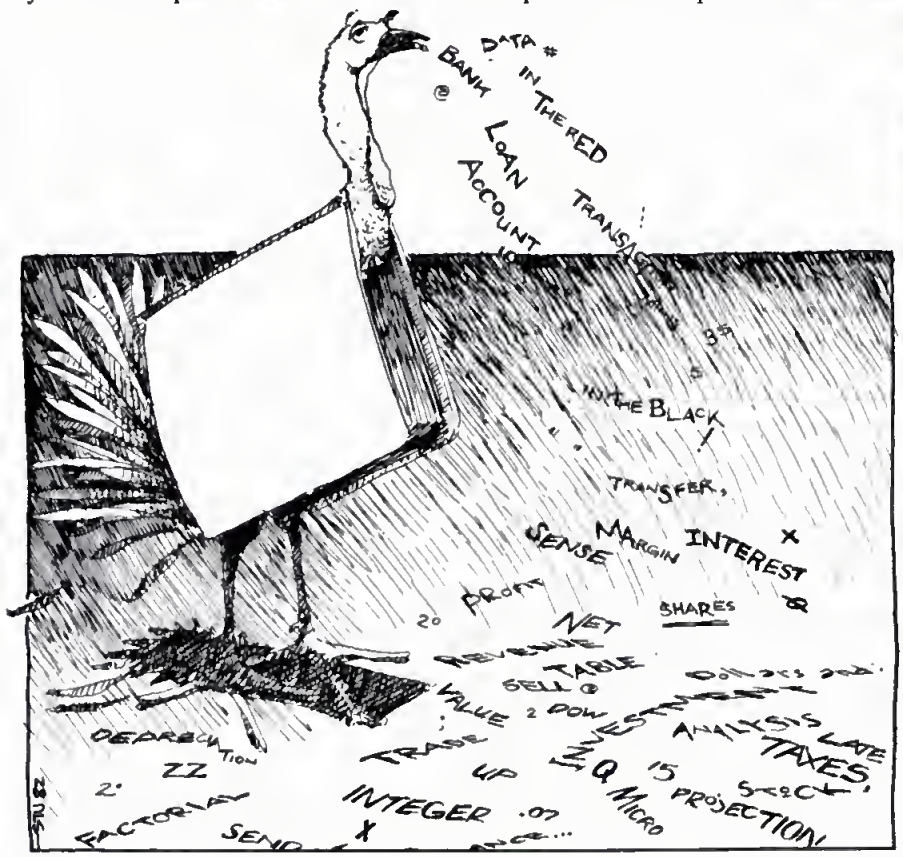
Teke the section called "Trying out Footnote without reading the rest of the text." First, as instructed, you use WordStar to examine the file called SHORT.TXT. The manual tells you what you should expect to see in the file. But the text in the file doesn't metch up exactly with the text in the menuel. In fect, if you bother to read the whole screen, you notice something extremely interesting peeking up at you from the very bottom, down on line 25. It reads:

THE TEXT IN the file doesn't match up exactly with the text in the manual.

```
ATTENTION!! ERROR IN USER'S
  MANUAL
```

You segely hit the Pg Dn key. And you discover a message informing you thet "the printout of SHORT.ORG on page 3 of the Footnote User's manual" is in error and advising you to follow the example "in the file SHORT.ORG on this disk."

Kind of the program to let you know, except for one minor problem: there was



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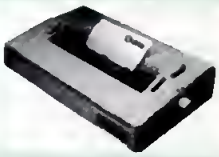

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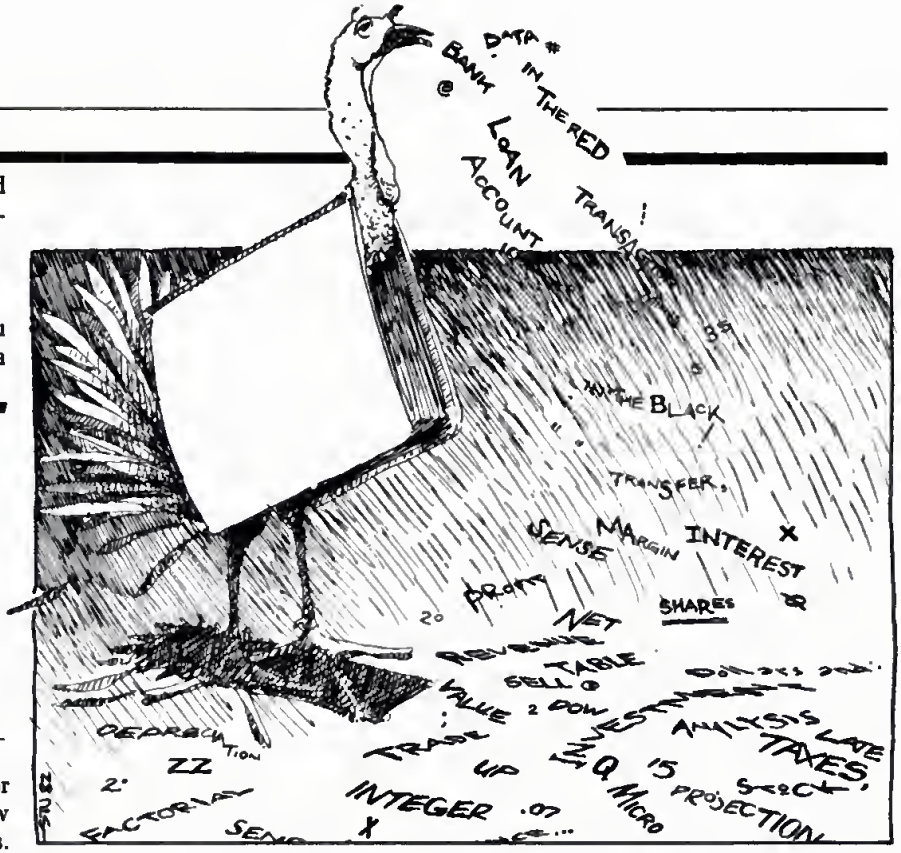
no file SHORT.ORG on the disk suppliad to ma. What's maant is SHORT.TXT — tha fila currently being read.

A Video Surprise

What heppans on tha screan whan you usa tha various Footnote options is also a surprisa. While Formet is running, for exampla, it displays an evar-growing row of astarisks and hroken vertical linas. Apparently this is normal, hut you'd never know it from the manual.

YOU WON'T GET superscripted footnotes at all if your printer won't do superscripting.



Nor does the manuel contain a llst of error messagas and thair lnterpratations. When you gat an arror massege—and I got quite e few—ell you can do is go to tha 1½-paga section on errors and hope it'll help. Oftan it doesn't.

Tha manual also ignoras tha fact that you won't get superscripted footnotes at all if your printer won't do suparscripting from WordStar with tha Ctrl-PT command. This leevas out any printar that can't do reverse line feeds: the original IBM (Epson) printer is exhihlt A. In fact, the way WordStor's Install program is writtan, you must modify or "patch" WordStor to ectivate the Ctrl-PT command for any printar running from a parallal port.

This is in part a failing of WordStor, but there should have bean et least token ecknowladgment of it in the *Footnote* manual. Evidantly Pro/Tem hasn't yat considered tha special idiosyncrasies of the IBM version of WordStor. Tha manual has no IBM-spacific informetion at all. It instead trias to cover all versions of Footnote et onca, laeding to locutions like "Tha distribution disk contains FN.COM (or .CMD or .EXE, dapending on your computer) . . ." and references to Appendix D of the WordStor menuel, which does not exist in the IBM version.

Tha manual can even lead you astray ebout the wey the program works. It cleims thet "Footnote usas the Ctrl-E for lts own housakeeping: the character will not print out."

True, the chorocter Ctrl-E won't avar print out. But if you happen to heve petchad your version of WordStor to use Ctrl-PE (which produces a Ctrl-E onscreen) for soma other function, such as expandad characters, expended characters are what you will get in your hard copy from tha first footnote reference right on through the end of your text. Tha sama thing is true of the copious Ctrl-R's end occasionel Ctrl-Y's Footnote sticks into your filas. If you've patchad WordStor to usa thase three commands, you hava two options: change the defaults in Footnote, or use Dehug to unpatch WordStor. If you've got a lot of patches in WordStor, you may hava to do both. Thare just aren't enough control characters to go around.

Editing the Options

The way you changa the Footnote defaults is to adit a fila called OPTIONS.FN, which isn't even consistent with its own internal onscreen documentation. One paramatar is listed as FNUMOPT at tha top of tha screen, but referred to as CALLSTYLE axactly 28 lines below.

By aditing this fila, you can change tha character that marks the notes; the style of the references (superscripted, superscripted end underlined, or underlined with a following backslash); the style of the footnotes (superscripted or on the line with a following period); the three control charactars tha program uses for housekeeping; the length of text on pages with footnotes and pages without them; end whether footnotes will ha split between peges if thare's not anough room for tham on tha current paga. But you can't omit or change the langth of tha rule that appears between text and footnotes. If you want footnotes et the bottom of the pege, thay'll eppear beneath e line of 20 underscore charactars. My guess is that you can edit this line after running Footnote, hut don't look in the manual for the answer.

THERE JUST aren't enough control characters to go around.

Woe betide you if you make an error in modifying OPTIONS.FN. Apparently Footnote doesn't carry defaults of its own, and it isn't smart anough to recognize something rotten in the OPTIONS fila. Just for fun, I deleted tha number callad

FNUMOPT (which you could easily do by eccident while editing it) and than ran Footnote on the sample file. Footnote blithely destroyed every footnote in the file without offering so much as an error messege.

Thet's not tha only way Footnote can neil you. Once you commit to working on e file, Footnote won't always let you out. In certein situetions, there's no graceful wey to back out short of a full three-key system reset.

A Demonstration of Errors

When you run the six-page FNSAMPLE.TXT through Footnote, you discovar (aside from the typos in tha text—one of which eppeers in magezine eds for the program) that an axtre blank line is inserted batween note 13 and note 14. It's there on the screen and it's there when you print it out.

Now, if tha paople who wrote Footnote can't get their program to do tha job it's supposed to, what chanca do you or I heve? I've looked at the sample, end I can't find eny extra charecters where they shouldn't be, so I have no idea whet's wrong. Clearly, though, the program allows absolutely no margin for arror in entering the footnota copy. A single extra charactar can throw tha entire documant off. Of course, you can correct en error and reformat—*if* you know the error exists. If I used Footnote, I'd scen the formatted documents with an awfully careful eye before I printed anything.

A lawyer ecquaintance tells me she'd love to have e progrem to let her do footnotes and move them around and then renumber them all just before printout and put them back into the proper piece. Thare may be a good way to do this with Footnote, but the manual isn't telling. It does say "you can aasily add or deleta text and notes" to e formatted file, but one pege later it reconsiders and admits that "Moving a block of text containing footnote cells or e block thet spens e pege with footnotes can be cumbersome." Helf a page of instructions follows.

Footnote seems to do most of whet it cleims, but without an extensive, professionel menuel, I can't recommend it. It might do for someone who desperately naeded footnoting capabilitias, but you might find you could enter a passal of notes in WordStar files manually in the tima it would take you to learn how to handle Footnote. And if you do e lot of footnoting, you'd probably be bettar off with a word processing program like The Final Word, which has the function built into it.

Besides, bafore committing valuable text files end learning time to a program, a user wants to hava some assurance that it'll perform. How much confidence can you heve in e program that doesn't even handle its own demonstration files properly?

FOOTNOTE isn't smart enough to recognize something rotten in the OPTIONS file.

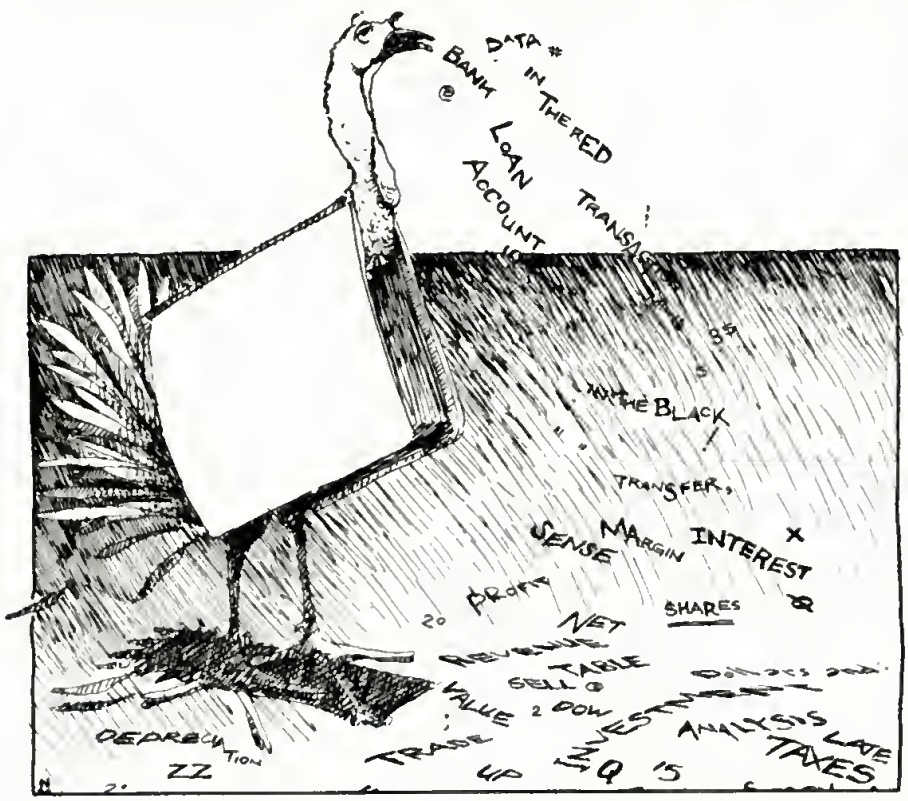
Oh, Pair!

The companion program, *Pair*, is the only pieca of software I've ever run into whosa warranty end copyright notice is nearly es long es the rest of the manuel. The instructions for *Pair* take up nearly two whola pegas.

In part, this is becausa *Pair* doesn't do ell that much. Whet it does is check to see if control charecters that should have metching terminators actually do have them. It will elso check for pairs of identical charecters, such as quotation marks and single quotation marks. And it can find out whather each left parenthasis, breckat, or brace (but not angle bracket) hes e right-hand mete.

You run *Pair* by typing Pair, a file name, and the letter of the control character or the actual punctuetion mark you're looking for. If you forget to type e character after tha filename, it looks for Ctrl-S (underlining), a defeult that can be changed. *Pair* searchas through the text, displays whet it finds between markers, offers error messagas whan it doesn't find e match within a user-selectable number of characters, and marks the text with a usar-dafinable character.

It seams to work. While it's working, it sands a lot of unnacessary (and undocumentad) stuff to the screen, including meaningless paragraph marks and double exclametion points end bleck-and-white heppy facas, some high-intensity, some



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CIRCLE 126 ON READER SERVICE CARD

low. It doesn't seem to display en error message every single time it finds e mismatch. But when it's done it does give you a count of how many markers it has stuck into your text, so you can go back into WordStor and check them out with the Find command.

PAIR IS A rather cockeyed execution of an excellent idea.

No Second Chances

The problem is that *Pair* requires one pass through the text for each charecter and makes you reinvoke the program eech time. You get no second chances. If you specify a nonexistent file name, you get en Abort error message thet unceremoniously sends you back to DOS or WordStor, forcing you to call the program up again. If you use a lot of paired commands (sey, underlining, subscripting, superscripting, boldface, and four types of punctuation), checking a file is tortuously slow. It would be a lot handier if you could give the program e table of things to look for and let it do its job in one pess, but *Pair* doesn't work that wey.

It cen also be fooled. In the cese of parentheses, for example, you heve to esk it for the left character of the pair. If you ask it for the right, it'll look for peirs of two rights and get confused. You won't get an error message, just a lot of needless markers to remove from your text. *Pair* does not create a backup file.

There are errors and points of confusion in the documentation, too. The standard default is 200 characters between the charecters to be matched, but there's another defeult of 255 built in. Depending on circumstances, you get one or the other, and the manual manages to refer to both in typically embiguous fashion.

I guess I might run Poir once in a while to make sure I didn't mess up and get a long stretch of underlined text. But, like Footnote, *Pair* is a rather cockeyed execution of an excellent idea.

Building a Bibliography

Finally we come to *Bibliography*. The documentation claims it will work with text editors other than *WordStar*, something I was unable to confirm. What I expected it to do was take the footnotes in e document and construct a sorted bibliography from them—something e scholar might prey for.

But what *Bibliography* does is a lot less useful to most people. It lets you construct a whole library file of bibliographical entries;

```
%Key:Keefe, 1983
%Author: Keefe, Janice
%Title: Recreational Knitting
 For Expectant Mothers
 (Softwear For Infants):
%Pub: Berkeley: University of
 California Press, 1966
%:Annot:
%:
```

When you make citations in your text, you enter them in the format: %Keefe, 1983. You cen then use *Bibliography* to pull the entries out of the library file and construct a custom bibliography for your particular document.

I heve e hard time imagining who would reelly need such e program. How many people keep referring to the same

Following completion of our review, Pro/Tem Softwore, responding to mony of the criticisms brought to its attention by writer Stephen Mones, onnounced it would issue Footnote version 3.1 and Bibliography version 1.2.

Spokesmon Poul Brest said that some of the changes hod already been mode—although they were not reflected in the copy of the programs sent to PC in late Januory. Brest said other olterotions will include on improvement in the appeorance and some of the presentotion of the manuals, a switch in the footnote style to reflect the University of Chicago Manual of Style, ond o chonge from "Hovard" to "Horvord" in the demonstration packoge. The basic operating design of the three programs will not be chonged.

Would-be purchasers of the program would probably be well served to look for the "improved" versions of these programs now ond in the future.

set of books ovar and ovar again in their writings? Scholars, I guess. Or is this another exemple of e programmer filling e nonexistent naed?

Once egein the manual end the samplas daal e knockout punch to the progrem. When you print out e bibliography in "concatanetad" form—continuously, rather than with line breaks as in the example ebova—you get the entire entry on one line. As tha manual ingenuously statas, when you choose this option "you will probably have to use the text-editor to formet the transferred entries to edjust the margins." Probably? Wall, unless you have a printer that runs out to column 163.

Bibliography doesn't even produce a standard bibliography format. *The University of Chicogo Monuol of Style* end other standard references show periods following the three mein parts of each entry in standard bibliographic style. *Bibliography* puts commas where those periods belong, and thare's no way to change thet dafault. What can you axpect from a progrem whose sample entry refers to thet venereble publishing housa, the Havard [sic] Univarsity Press?

Is this another example of a programmer filling a nonexistent need?

Tha *Bibliography* documantation refers to e disk file called SAMPLE.TXT when no such file exists. And it seys it will work in conjunction with *Footnote*. But it does not give you a clue as to how.

Maybe it's just as well. I wouldn't hava had the guts to check. And frenkly, I didn't heva tha stomach for checking up on the rest of the *Bibliography* options, such as sorting and listing libraries, and merging bibliographies. I exited the progrem and entered Jeck Deniels. */PC*

Free-lonce writer Stephen Mones uses his PC—ond WordStar—to prepore mogozine orticles ond o novel in progress.

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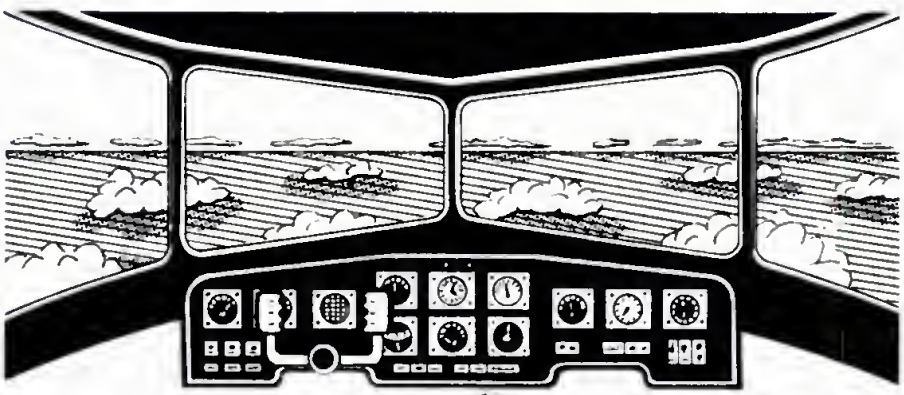

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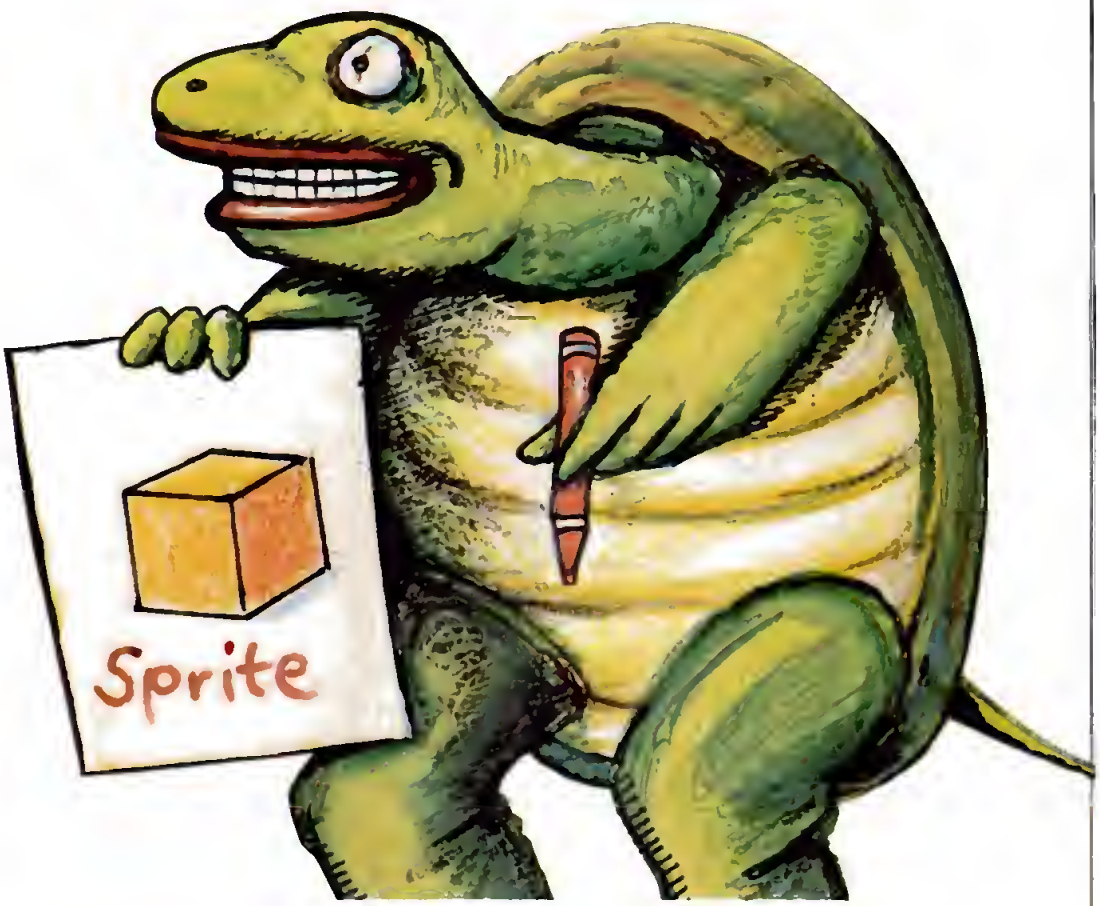
Gary Kildall's announcement promises a powerful, graphic conclusion to PC users' long wait for a turtle to arrive.

DR LOGO: A New Start For Beginners



BASIC's deys as the standard beginner's computer languege are numbered—so hopes Digital Research. The company hes just announced its own improved version of the LOGO language, DR LOGO, a graphics-oriented interpreter the company believes will be even more comprehensible to first-time users than earlier versions.

DR LOGO (or "Doctor LOGO," as it is nicknamed within the compeny) was written by the founder end president of Digital Research, Gary Kildall. When Kildall presented the new language et the CP/M'83 computer show held in San Francisco lest January, he didn't mince words. "We're going to replace BASIC—that's the whole motivation," he said.

Stephen Meysonave, the compeny's director of field operations, steted it less bluntly. "It won't replace BASIC entirely," he said, "because there are alreedy so many applications written in BASIC. But anyone who's never used BASIC finds it easier to use than BASIC. We think it will eventually displece BASIC es a first languege."

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Software Breakthrough...

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Technical Review
by Wayne Hepburn

QUIKPRO + PLUS is a new breakthrough in software for microcomputers from ICR-FutureSoft.

Until now, whenever you wanted a new separate program in BASIC (Microsoft Basic/MBasic/Basic 80/Oasis Basic), you had to spend a lot of dollars for it, or a lot of hours creating it (if you have the know-how). That's all in the past now.

Anybody who can turn on a computer can write a program, quickly, with this new *Quikpro + Plus* software which generates programs for you. *Quikpro + Plus* is the invention of Joseph Tamargo of Florida. His brilliant approach to program writing allows you to tap the real power and speed of your microcomputer, and it is about time this happened.

I interviewed him to find out more about *Quikpro + Plus* and pass this valuable information to you. He told me "The best part of this software is that it gives you a separate custom program every time you use it. The resulting program is produced, error-free, in BASIC (Microsoft Basic/MBasic/Basic 80/Oasis Basic, as appropriate to your system) for you by *Quikpro + Plus*. What's more, you can list your new program, look at it, see what makes it tick, and modify it as you wish."

You can also, customize, enhance, alter, and even copy the programs you create with *Quikpro + Plus*. This is because programs created by *Quikpro + Plus* are structured, easy to follow, and include many REMARKS statements right in the program listing. I don't know of any other software with the flexibility and ease of use I found in *Quikpro + Plus*.

HUNDREDS OF APPLICATIONS...

For Education, Business, Hobby, Home, Science, Personal, etc. a partial list includes programs like these: Financial Forecasting, Expense Planning, Data Access and Retrieval, Modeling, Record Keeping of all kinds, Statistical Data Banks, and much, much more. *Quikpro + Plus* cuts the time it takes to generate a new custom program down to a few minutes. That's true. I saw a letter from a user who created a separate program in Basic within fifteen minutes after reading the clear, simple, complete Documentation & Operating Manual for *Quikpro + Plus*. The software will generate File Handling and Data Entry Programs in a file format, drawn right on the screen by user. Programs created by *Quikpro + Plus* produce standard ASCII Data Files allowing data to be easily accessed by other programs, other micro's, and even main frames.

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You can perform all manner of computations among various fields in each record. You can selectively calculate and print resulting data only, or Data Base and results, or alter Records by calculation results, and so forth. The possibilities seem unlimited. And keep in mind that the power and features I am talking about end up in the separate new custom program *Quikpro + Plus* writes for you.

This software is ready to ship immediately and you can start writing programs the day you get in. In fact, ICR-FutureSoft guarantees your satisfaction or you can return it for a full refund in ten days after delivery. How's that for confidence? Mr. Tamargo said "There isn't any risk to us...our product works like it's supposed to work and users are very well satisfied. We are glad to guarantee satisfaction."

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LOGO for the PC

DR LOGO is scheduled to hlt store shelves in the third quarter of 1983, but "there's e reesonable chance that the version for the IBM PC might come out as eerly es June. It's a matter of getting the documentation," said Meysonave. The original equipment menufecturer (OEM) version should be ready by May. DR LOGO hasn't been officially priced yet, but it won't strey fer from the cost of Terrepin/Krell LOGO and Apple LOGO (ebout $150) and probably won't exceed $200. Digital Research plens versions for mechines other than the PC, but no delivery detes have been set.

A FULL-SCREEN procedure editor lets the user edit commands before the LOGO interpreter evaluates them.

DR LOGO works with the CP/M-88 operating system; Digital Research's Kildell wrote both. Coincidentelly, Digital Research just released a $60 version of CP/M-86 for PC users—the version IBM licensed from them for the PC had been priced at $240, effectively encouraging PC owners to purcbese IBM's $40 PC-DOS. Before you rush out end buy the new bargain CP/M-86 in preperation for DR LOGO, note thet DR LOGO will already contain e condensed version of the system. The stand-alone CP/M-86 incorporates utilities and amenities not aveilable in the LOGO interpreter package, but enough of CP/M-86 remeins on the disk to insure that all files generated in DR LOGO will be CP/M-compatible.

DR LOGO's strength lies in its simplicity and power, enabling beginnlng users to start progremming elmost immedietely. Its more than 150 built-ln functions, called "primitives," cover e range of applications from games to bar charts to list processing. Users can utilize the entire IBM PC memory: up to 100,000 workspece nodes (one node equaling six bytes), or 40 times the workspece aveilable with most LOGO interpreters. To provide this expanded capacity, however, DR LOGO requires 128K of RAM, so many PC owners will need a memory expansion card. Other hardware components you'll need to run DR LOGO

DR LOGO'S HELP facility will show you the name of each LOGO primitive and explain how it is used.

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include an IBM color/graphics adapter, e color or monochrome graphics monitor (but not a character-oriented monochrome monitor), and a disk drive.

LOGO Commands

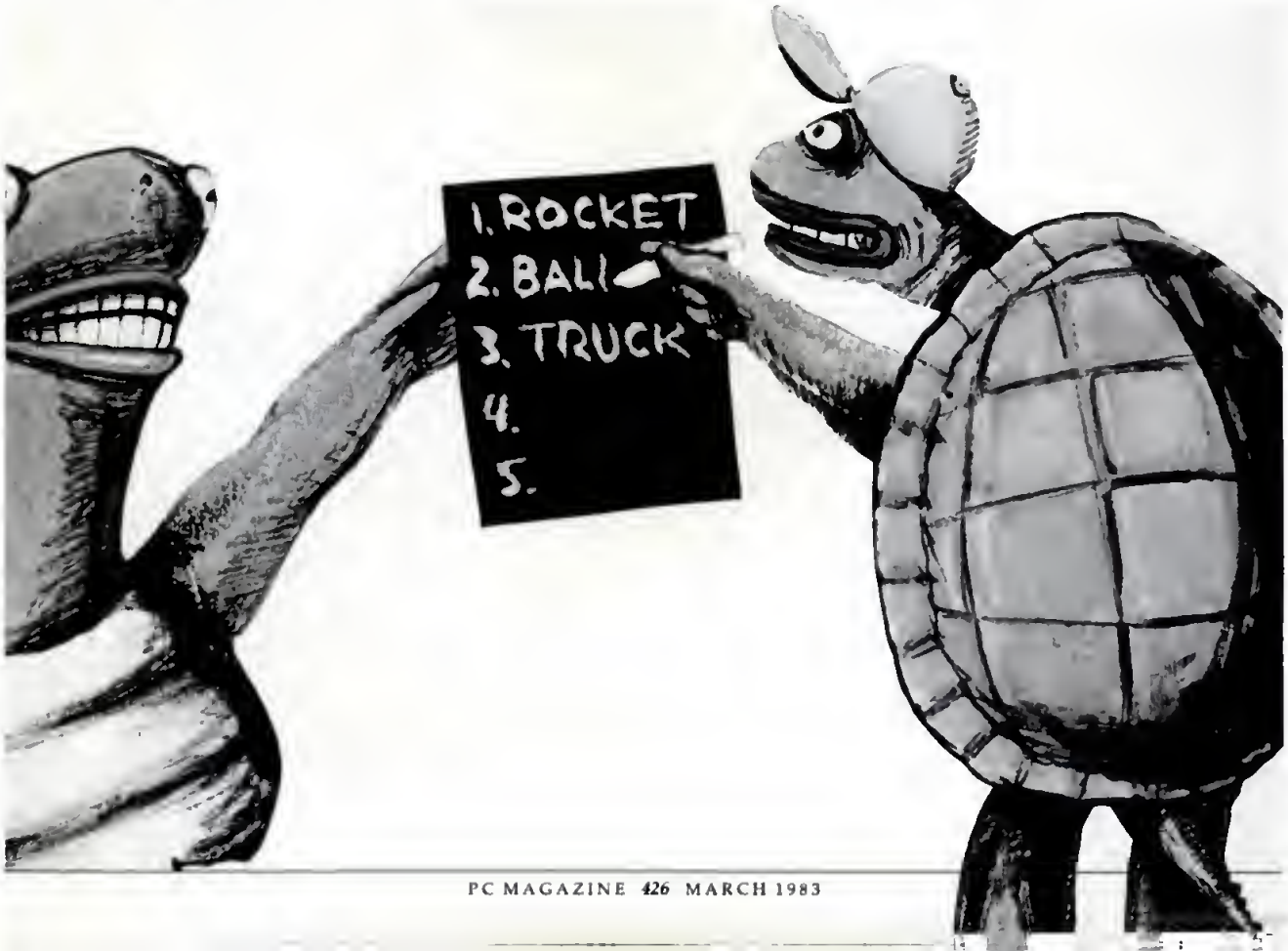
The language's workspace commands provide all the capabilities found in Apple LOGO, as well es several eddition-al capacities that will let programmers debug and cross reference procedures they've constructed. For instance, FOLLOW lets you reorder procedures in your workspace. POTL (Print Out Top Levei) looks through the workspace to find all top-level procedures. POCALL (Print Out CALL) shows the procedures as they are nested within one enother, end POREF (Print Out REFerences) locates all the procedures that reference another specified procedure. And if you get lost in e welter of procedures and primitives, you can cell DR LOGO's Help facility with the primitive POPRIM (Print Out PRIMitives), which will show you the name of eacb LOGO primitive and explain how it is used.

NEW PRIMITIVES for DR LOGO simplify game writing, string processing, and line editing.

Heve you ever written a lengthy, complicated program but found when you returned to debug it that you couldn't remember wby you designed a particuiar procedure as you did? Kildall must have bumped his bead against that wall often. In DR LOGO, he provides a special primitive calied NOFORMAT that aliows you to write extensive comments beside the program as you enter it. Then, after the procedures are recorded, it stores the comments on disk for future reference, freeing up valueble workspace.

Other features of DR LOGO include text windowing, permitting users to interpolate words, commands, or editing instructions wherever desired in a graphics dispiay. Primitives for upper- and lower-case characters and for indentation let the programmer organize his or her procedures more legibly. A full-screen procedure editor lets the user edit commands before the LOGO interpreter evaluates them. New primitives for DR LOGO simplify game writing, string processing, and line editing.

USERS CAN utilize the entire IBM PC memory: up to 100,000 workspace nodes.



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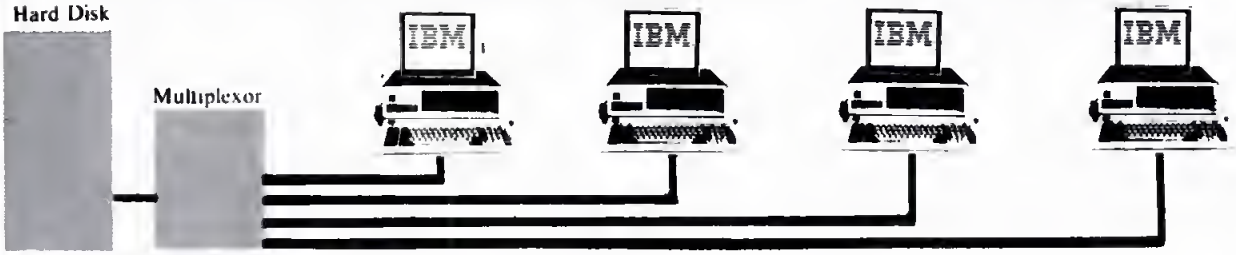

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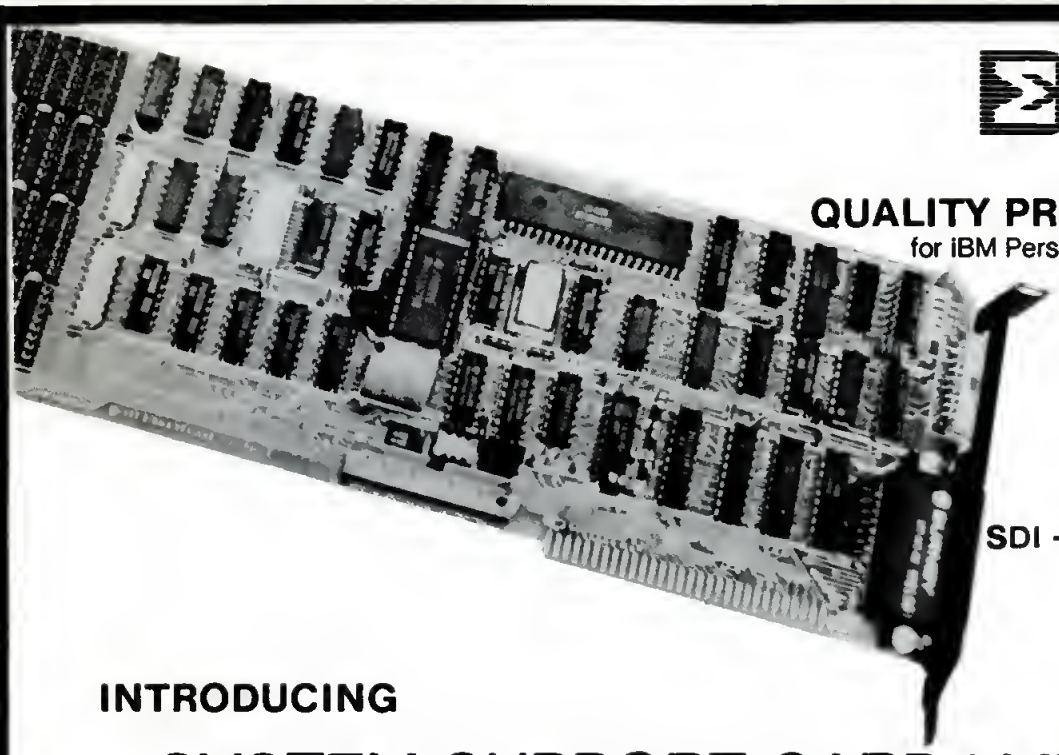

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Graphics for All Ages

Of course, DR LOGO employs the original LOGO's familiar turtle graphics, using the triangular pointer, which leeves e path of color and draws geometric shepes. A cartoon-illustrated tutorial for children and an edult-oriented tutorial instruct users in how to guide the turtle. At the other end of the scale, DR LOGO is upwardly competible with GSX Graphics, another DR product: GSX extends CP/M's disk-operating capehility to control high-level graphics hardware.

In his speech at CP/M'83, Kildell emphesized that DR LOGO had "no floor and no ceiling." Though the lenguege is simple enough for children to use to leern programming, it's flexible end strong enough for advenced business and graphics applications. He described how his son Scott learned LOGO—not through intensive study, but through experimentation end pley. Scott's first major project was e home version of Donkey Kong, the popular video game. The boy built the game's characteristic ledders end girders component by component, designing the building blocks, then guiding them into place. "It got him over the threshold of typing a progrem," said Kildall. With LOGO, children (and other first-time users) can teech themselves to program without meth, though they can use LOGO to learn meth, geometry, end English. Children can treat DR LOGO like e coloring book, e computerized Etch-A-Sketch, on their way to computer literacy. LOGO grows with the user, he said, while BASIC cannot. One LOGO user in the eudience commented thet he had used LOGO effectively with third-graders. Kildell added thet he felt one could begin as early as preschool.

ANYONE who's never used BASIC finds it easier to use than BASIC.

Despite his glowing vision of DR LOGO replecing BASIC, Kildall wryly edmitted he knew there were still a few holdouts. No metter how he tried, he couldn't convince his son Scott to stop progremming in BASIC. */PC*

Reod more obout this lenguoge in "LOGO: A Lenguoge for Children of All Ages" (PC, Volume 1, Number 8). Digitol Research, Inc. con be contocted ot P.O. Box 579, Pocific Grove, CA 93950, (408) 649-5500.

Vanesso Schnotmeier is o free-lonce writer based in Oaklond, Colifornio. She is on editor for Her Sey, o women's news service, ond hos been on the editorial stoffs of Sierra mogozine, BBC Rodio news, and Military Electronics/Countermeasures.

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In the fast-lane world of microcomputars, most products can't saem to achieve much more then "Queen for a Day" status. Osborne's best-selling porteble is immediately chellenged by the larger-screened Kaypro; VisiColc, SuperColc and e dozen spreadsheet clones square off et high noon; Apple gets upstaged by IBM and comes back with Lisa, while VisiOn weits in the wings to wrestla Lise to tha floor. One exception to all this scrimmeging is the unparalleled success of MicroPro International's WordStor word processing softwere, e program thet has nevar really had a sarious Avis to play Hertz to. By the time IBM unveiled tha 16-bit Personal Computer, WordStor was Number One on virtually avary eight-bit machina in the business. MicroPro's IBM version quickly beceme the best-selling word procassing program—and according to some sources, the best-selling piece of software—for the PC, despite the fact that IBM itself had thrown its corporate weight behind EosyWriter.

WordStor is indeed an awesome program. I've used it myself on the PC since it cama out in mid-1982, and I've found it compares favorably with dadicated word processing machines I've written on in newspaper city rooms. But WordStor is finally getting a little competition, in fact, a lot of competition. WordPerfect is one of e number of second generetion IBM word processing programs, written specifically to take edventage of the PC 16-bit capebilities. While it isn't es perfect as its nama implies, WordPerfect is very impressive, a more than full-featured program with e few truly state-of-tha-art goodies tucked into the peckaga.

WORDSTAR is finally getting a little competition.

A Well-Endowed Package

For starters, WordPerfect includes (all on one disk, as part of its regular word processing packege) severel features that would cost hundreds of dollars to edd on to WordStor. Among these are a merge program for writing form letters; a meth program that allows you to do celcule-

Illustration: Don Day

tions within an article or report; a footnote feature that permits footnotes of up to a page in langth, and that automatically renumbers footnotes if you insart naw ones; and a macro utillty that lats you use a few keys to invoke a series of commands or a sat of words automatically. Tbis last feature (not unlika tha very good ProKay program put out by ProSoft) can be a tremendous timesaver. For exampla, you can use lt to writa a minl-program that signs off a latter in a particular way on a particular part of the page:

Sincerely yours,

Joe Van Blow
Executive Vice President

MOVING around within WordPerfect is a joy.

You can then save the mini-program and invoke it with only a few keystrokes every time you write a latter. (The macro and merge faatures can also be combined during tha writing of form letters to do a variety of sophisticatad tasks, from inserting boilerplate to sanding copies of your work to diffarent printers.)

All of these extras would be nice enougb, but *WordPerfect* is also a winner in the regular old word processing department. Tha program supports soft hyphens, super- and sub-scripts, conditional page breaks, and virtually avary othar feature that one ought to expect from a bigher-priced program. (One exception ls split-screen capability, which ls included ln Mark of the Unicorn's Finol Word.) *WordPerfect* has search and replace capabilty (both forward and backward) to locata a particular word or words in a document. Underlining and boldface are shown on your screen tha way they'll appear in your printed copy, not with codad commands. When you sat up margins and spacing on an article you're working on, the program remembers them; you don't have to set them up all over again the next time you open up the documant. This ls especially nice if you're simultaneously working on a single-spacad letter with standard margins and a double-spaced article with narrow margins and you want to type them the way they'll appear ln print.

THE TEMPLATES are made out of what seem to be cheesy-grade construction paper.

Sounding the S.O.S.

A Help faature, invoked by pressing shift and F3, alphabetically lists all possible commands (advance line, alignment, etc.) and talls you bow to do them. It thoughtfully directs you to the place in

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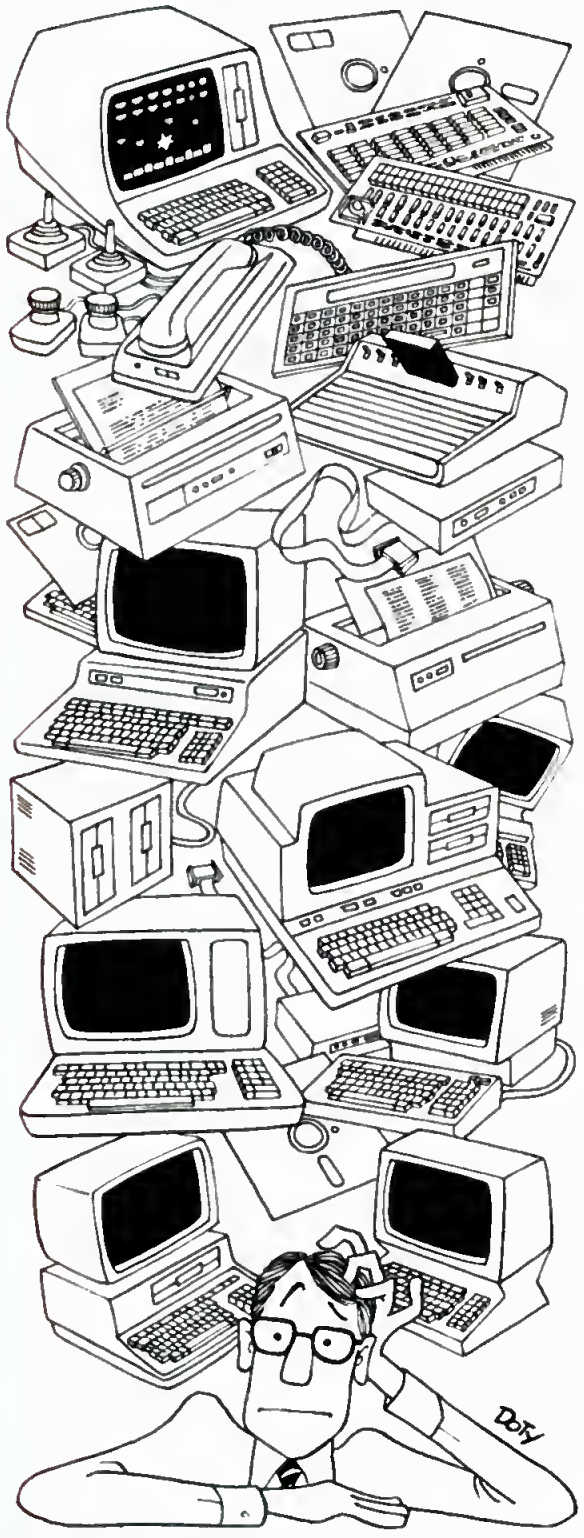

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WORDPERFECT threw hunks of white stuff between my words like so much squished-up Wonder Bread.

But my personal favorite feeture, and one thet ought to appeel to other users who compose, rather than copy, text on their computers, is the WordPerfect eutomatic paragraph reform. The bana of my relationship with WordStor hes baan a command called Ctrl-B which is performed by pressing the control and B keys simultanaously. It is a penenca I have to perform every single time I go back to rewrita or edit or insert or delete something in an articla in order to maka ell the copy neat egein. If I forgat—which is e frequant occurrence, sinca I'm usually concentrating on being a writer, not a typesattar—my paragraph ends up with bombed-out white-space excavetions in the middle of lines and words dripping out of the margins like spaghetti slopping over the side of a cen. WordPerfect does all this cutting and pasting autometicelly.

To set up the program, you're instructed to place key stickers end templates over the entire top row of kayboard keys, all the function keys, and severel other keys. My first complaint about WordPerfect is thet the templates ere mada out of what seem to be cheesy-grede construction peper, end they beceme dog-earad within a few sessions. Since the key sequancas ara fairly complicated, the manufacturer could have sprung for some plestic templates to nursa users through the learning period.

Naming Your Printer

The first time you use WordPerfect, it esks you a number of questions about your printer end other equipment. It supports singla-sheet paper faeders and even certein types of feeders with duel paper bins. This was the occasion of my second complaint, although it might not be yours. WordPerfect works on a Qume Sprint 5 or 9; e Dieblo 1650, 630 or 620; an NEC Spinwriter 5515, 3515, or 7715; the NEC 3550; or an Epson with Greftrax. All othar printers, such as my valiant F-10

Starwriter, are considerad "lina printers." Whet this meant was thet while my printer typed everything, what it typed didn't turn out as pretty as it ordinarily does with WordStor. My attempt to justify the type resulted in pock-marked lines. Instaad of proportional spacing, WordPerfect threw hunks of whita stuff between my words like so much squished-up Wonder Bread. My footnotes elso feiled to superscript and just sat there lika regular old numbers. If you care about such things and you don't happen to own one of the specified printers, this program may not be for you. (I later tried to experiment with reinstalling my printer es en NEC 3550, sinca both that printer and mine run under the sama WordStor printer installation—but it didn't work.)

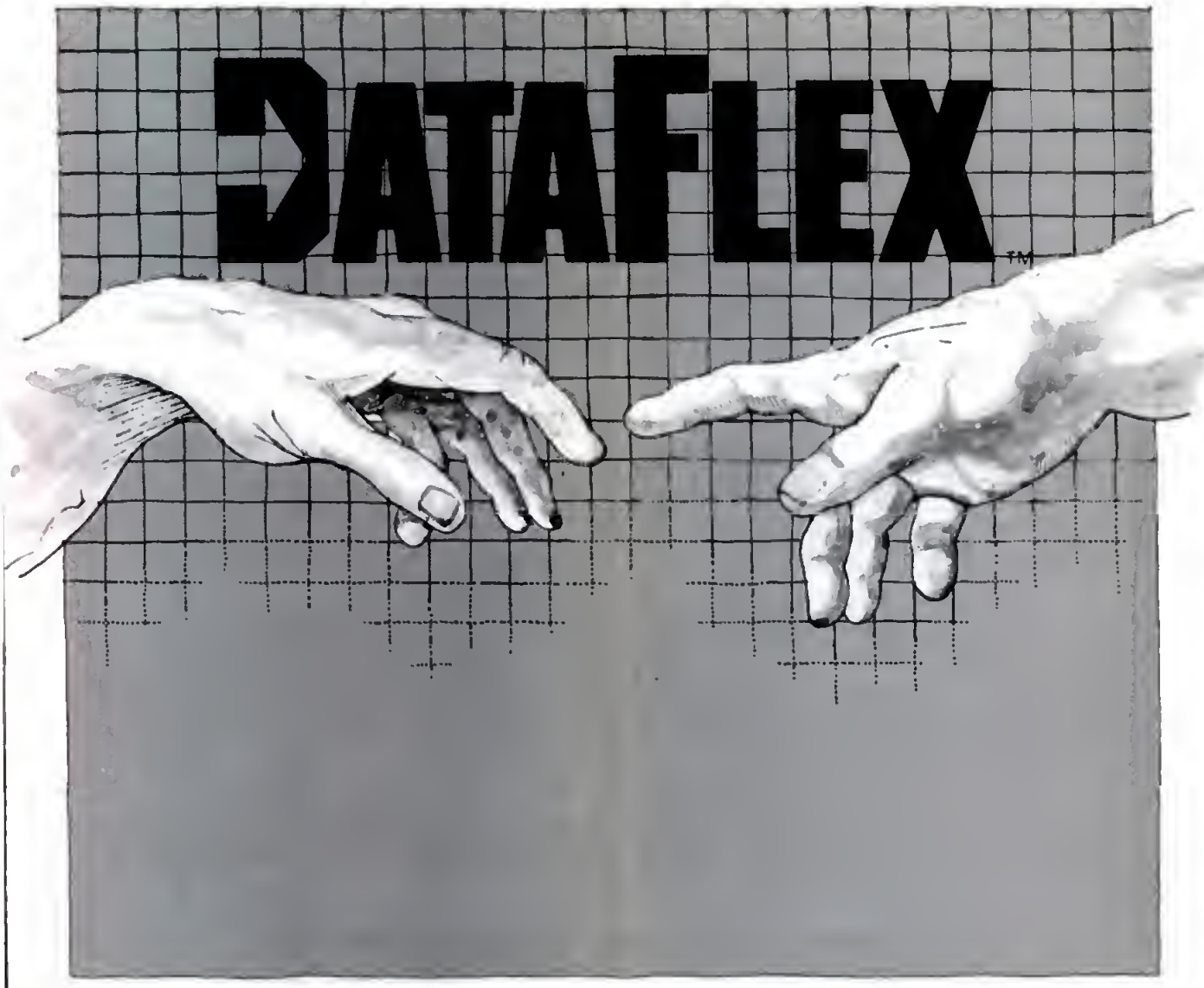
My third complaint ceme when I tried to run the WordPerfect "Preview" tutorial program. At least, I think it's e tutorial. On my disk, the program simply ground to a helt efter e few screenfuls of what appeared to be pretty unhelpful hints. For example, Preview grandly announcas the fect thet it can underline, but it doesn't tell how to do it. On the other hand, the accompanying manuel—In the de rigeur IBM-style 8- by 9½-inch looseleaf—is e model of good orgenization and clarity. Instruction is divided into four levels of ascending difficulty, and eech command includes learning exercises. My only criticism was tha index, which is limited to entries corresponding to the nemes that tha manufacturer has given each command. Thus, if you want to look up how to format your text into newspeper columns, you won't find it under "newspaper" or "columns"; it's under "text columns." (In reel life, of course, you'll end up looking through the whole manual.) Tha manual also includas a page callad "HELP—if you press a wrong key," which provides numerous suggestions for extricating yourself from the kinds of problams that most of us tangle oursalves up in when we're learning word processing.

I did manage to crash WordPerfect, by ettempting to print out e WordStor file. The whole screen literally froze—I couldn't even move the cursor. Luckily, the program isn't copy-protectad, end I had made a back-up.

IN SOME cases, WordPerfect makes it more difficult than necessary.

A Blank Beginning

Upon booting, you're confronted not with a series of menus, but with a near-blank screen. In the bottom right-hand corner is a pristine little status line, telling you your pege, line, end column numbers. This uncluttered spareness is offsat by a WordPerfect tendancy that others may appreciate but that threatened to



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drive me up the well. Whanaver you "kay in" to any of a number of command modas—underlining, boldface, flush right, columns, etc.—if you go back a bit to chenge a word, a flashing sign pops up on the lowar laft hend of the screen and demends to know whather you in fact went to delata whetavar it is you're changing. It keeps aftar you until it gets a yes or no answer, and if there's a wey to diseble it, I couldn't find it.

Moving around within WordPerfect is a joy. There are more options than I have spaca to detail, but e few examples should give you an idee. Press "paga up" and "pege down" end you gat just that, tha previous or following page of your documant. Press the minus and tha plus on tha numaric keyboard end you'll get screen up or down. Still anothar option is Control/Homa, followad by tha number of tha page you want to go to. The home key usad with any of tha four arrow keys puts you at tha top or bottom of your screen, or et the beginning or end of your lina. Two homas and a press of tha up or down arrow key gets you to aithar the top or the bottom of tha article you're working on. Other commends allow you to delate letars (forward end backwerd), words, linas and pegas. Thasa cursor moves have a certein intarnel logic, and thay are easier to laarn than tha aquivalent WordStor keystrokas.

Tha other keystroka commands are a diffarant story. Unlike WordStor, whose commands all involve tha control kay and then aither ona or two latters, usually bearing soma relationship to tha commend itself (s for sava), WordParfact commands must be memorized. Ona set of commands involves function kays; anothar, tha shift key and the function keys; and still others involva aither the control or the eltarnete kay and tha various number kays along tha top of the keyboerd. None of thase is set up in ways that are aasy to remamber, and in soma cases, WordPerfect makes it more difficult than necessary. For axempla, the templetes are set up so that naxt to, say, the F6 kay, it reeds:

```
Set Format
Bold
```

The top command—e manu of different teb, margin, spacing, end hyphen options—is lnvokad by prassing F6 and tha shift key; the bottom commend, for boldfaced printing, is invoked merely by pressing the function kay. My own intuition eftar 20 years of typing wes that tha bottom function ought to be tha one requiring the shift kay. I constently screwed up all the shift/function commands, aven with the templete staring at me.

MY OWN intuition after 20 years of typing was that the bottom function ought to be the one requiring the shift key.

Reaching for the Buffer

Block moves were also a little confusing to laarn, but wall worth the trouble. WordPerfect features a buffar, so thet whan you daleta e block, you cen change your mind and gat it back egain, at laast until you put something else into tha buffar. Tha problem is that onca you've told tha program that you want to mova something, it asks you if you want to "cut" or "copy." The correct answer is "cut," which removes the block from the screen and puts lt into tha buffar until you enter the manu command to retriava it. Tha seemingly mora sansibla "copy" lets you mova your block, but you'll heve e duplicata block in the old locetion. If you went to delate tha block rethar than moving it, you simply laeve it in the buffer end forgat about it. I found it exasperating to press the "cut" menu option when I wanted to move end the "move" moda kay (Alternate 9) when whet I wanted to do was cut. It would seem thet a program as command-rich as this ona could heve figured out e wey to perform these functions separately.

IF YOU'RE a new PC owner who's scouting around for a top-of-the-line program, check this one out.

Another faature that soma may lika and others will hata: WordParfact doasn't autometicelly back up e fila. WordStor does, which is nice for security, but it maans that on a singla-sided 160K disk, you cen navar hava e fila of more then 80K—the original fila plus tha automatic back-up.) I prafer the WordPerfect systam mysalf. In any casa, it's e simpla matter to back up disks on this program if you desire.

A similar, oftan-haard gripe ebout WordStor is that you can losa all your work if you fill up a disk and the program can't sava your current copy. There's no option to axit to tha systam to arase other, lass-neadad files on the sema disk or to put e blank disk in tha B drive. WordParfact does let you exit without having work disappear into the computer void. I once lost tha better part of a megazine article to tha deadly jaws of WordStar this wey, and so I tend to feel strongly ebout it.

WordPerfact, in short, is e real find, daspite its feults. I don't think I'd recommand it to someone who's elreedy bought and laarnad WordStar, unless, of course, ha or sha is a fanatic hetar of the Ctrl-B command. But if you're a new PC owner who's scouting around for a top-of-the-line program with good documentation and almost avary bell and whistle in the book, check this one out. */PC*

New modem technology implemented with the latest microprocessors promises to lower prices and give 1200 baud a boost.

1200 Baud: Speed of Choice for PC Communications

With the introduction of the IBM PC came widaspreed recognition from corporata data procassing managers that there was a placa in tha modarn offica for parsonal computers and electronic work stetions. But tha affective usa of sucb systems required the marriage of computers and communicetions.

Corporate computer users often need to communicate with other PCs and with axisting minis and meinframes. IBM certainly recognized this; one of tha few eddons evaileble et tha tima of the initiel PC announcamant was an RS-232 asynchronous serial adepter and its asynchronous communicetions support packaga.

IBM subsequently updeted the Async peckage with version 2.0 while adding 3101 tarminel emulation. Naw synchronous communicetions support hes come by wey of synchronous date link controi (SDLC) edepter berdware and 3270 tarminal emulation software. The clear signal is that IBM viaws the PC as e communications mechine.

IBM VIEWS the PC as a communications machine.

Applications Point the Way

Corporate customars have varying communications requirements. A large brokerage/investment firm, for exampia, may bave hundreds of brench offices end savarei thousand brokers spread across tha country. To echieve faster responsa to customer inquiries and increesa productivity, brokars need up-to-the-minuta market quotetions et their desks. The solution is IBM PCs equipped with RS-232 edepters end auto-dieiing modems. Sinca aech broker needs a work station, tha per-station cost should be low. Howaver, trensmission tima must be short to minimize "blocking" (whan eil access linas are busy) at tha cantral detebesa computer. Tha modem speed is autometicaiiy determinad from the epplicetion requirements. Most modams run et 1200 beud.

In another case, a lerge menufecturing compeny seiis its products through a natwork of 10,000 indapendant, single-line deelarships. Daily salas are antared by itam into each dealer's PC. A running inventory of both larga and smell items is maintained by the computer. The PC is equipped with an auto-answar/euto-diel modem, aiiowing the menufacturer's centrel computar to poll tha PC during the night. Ordars are genereted automatically from the dealer's inventory levels, allowing the daelar to concantrata more effort on sales rether than business management. Tba deeler also has eccass to manufacturars' specialized analysis progrems, whicb help pinpoint potential problem eraes such as casb managemant, overheed costs, and saies trends. The deaier may aiso profiie tha businass to maasure parformence relative to other dealers. Sinca the centrel computar must poll such e large number of daalers every night, 1200-baud auto-dialing modams beva to be used to minimiza tha number of WATS lines at tha cantral sita. 300 baud is unecceptably slow.

1200 BAUD modems can theoretically reduce connect-time by 75 percent, resulting in significant savings.

Tha dacreasing price of main memory coupled with tha larga 1 megabyta eddress space bas fostered e trend toward largar programs end data files for tha PC

rather than for Z80 equipment. As phone bills rise, connect-time costs with 300-baud modems cen quickly become excessive. 1200-baud modems can theoretically reduce connect-time by 75 percent, resulting in significant savings.

While market forces creete the need for faster modems, advances in technology promise to reduce their manufecturing costs. As a result, most modems instelled on the PC will likely be 1200-baud, Bell 212-competible units. Nearly all second-generetion 1200-baud modems will be microprocessor based and will provide e simple interfece necessary for office epplications. Modem designers will follow the lead of computer designers and work to eliminate most control switcbes end lamps from the front panel. This will result in greeter ecceptance of modems by nontechnicel office personnel.

History of the 1200-Baud Modem

In the computer age, a great idea commands attention for just a few years before another great idea comes along.

Half-duplex 1200-baud modems (which communicete in only one direction et eny given time) heve been aveileble since the late fifties. In 1972, John Binghem of the Vadic Corporation designed the first 1200-baud full-duplex modem capable of long distance transmission over standerd telephone lines. The resulting VA3400 product wes first merketed in 1973. Over e period of yeers, Vadic built e significant base around the "3400 stenderd," primarily emong timesbaring companies end their customers. Even though e few other modem compenies developed incompetible proprietary designs, only Vedic was eble to echieve e significant base.

In 1977, however, the 1200-baud modem industry was surprised by Bell's announcement of the model 212A. Unlike the 3400, the Bell 212A used carrier frequency essignments similar to the 300-beud Bell 103, making the 3400 and 212 fundamentelly incompetible. With Bell's size and merketing influence, the 212 quickly surpessed the 3400. When epplied to the Bell 212, this technique requires a symbol rete of only 600 symbols/second, ellowing relieble communicetion over limited bendwidth telephone lines.

A number of second sources for the 212 subsequently emerged after Western Electric went into production with the unit. The second-sourcing occurred because Western wes berred by e 1956 Consent Decree from selling its equipment to the public. By 1982 many vendors, including Vedic, hed jumped on the 212 bendwegon, attesting to the clout of Bell, end the market's desire for uniform compatibility. —*ME*

Economics of 1200-Baud Modems

Faster modem speed requires additional circuitry to implement its more complex moduletion method. Modems can be evelueted on e cost effectiveness basis. Peying "e buck e baud" is the traditional rule-of-thumb used by seasoned deta processing manegers, but a more precise calculation is possible. For example, a popular 300-baud modem sold in computer stores retails for $289, giving 96¢/baud. A bigh-performance 1200-beud equivalent sells for ebout 75¢/beud. 1200-baud 212 modems may have alreedy surpessed 300 baud on e price/performanca basis, but this is only one of two key economic factors. The other is "thresbold price," the psycbological level where enough edditional velue is perceived to cause serious users to switch from 300 to 1200 baud.

In 1982, market forces displaced the more costly VA3400 protocol in fevor of

Inside the Bell 212A Standard

A short, technical explanation of 1200 baud communication over voice-grade telephone lines.

Although vendors might add, change or delate tha *A* suffix, the *212* standard refars to a modulation/encoding schama to accomplish full-duplex 1200-baud communication over ordinary talephone lines.

Simpla Ball 103-style modems make usa of a pair of tones (2225 Hz and 2025 Hz) distinguished by frequency to represent the two bits 0 and 1. The faster, but mora complicated 212 standard uses four phase changes of a constant audio carrier (2400 Hz) to represent tha four possible two-bit groupings (called "dibits") 00, 01, 10, 11.

The necessity of dasigning a more complicated, more costly system arises because of the limited frequancy responsa, or fidelity, of the telephone network. Tha combined techniques of grouping bits into dibits and changing carrier phasa rather than frequency allows reliable, simultaneous, bidirectional 1200 baud communication over voice-grade lines.

The four different signal possibilities are callad "symbols" in communications jargon. Ball's 212 standard ancodes two bits of data into ona symbol. Tba time bin occupied by a given symbol is known as a "chip."

To illustrata tha ancoding process, suppose we had four symbols: an orange (00), a grape (01), an apple (10) and a banana (11). Before transmission begins, wa agrea on tha symbol-to-dibit encoding. Wa also agree that i (being the transmitter) will hold ell four symbols behind my back, pulling out ona to show you (the receiver) each second. I will, of course, return the previous symbol behind my back.

Now, over a 5-second interval, suppose i show you the symbol sequence: orange, grape, orange, appla, banana. You, in turn, correctly decode this symbol sequance es 0001001011, effectively communicating 10 bits of information in only five seconds. Bacausa bandwidth consumption is proportional to symbol rate (not bit rata), the bandwidth requirement is halved by this encoding. —*ME*

tha Ball 212 protocol. This trend toward increasad standardization helped -increasa voluma, causing 212 modam prices to decline. A complete, auto-dialing, auto-log-on 212 was still ralativaly axpensiva in 1982. However, naw modam technology will allow 1200 baud production costs to drop. The savings sbould ba passed along to the consumar, causing a huge increase in 1200 baud demand by PC ownars, and ovarwhelming adoption of Ball 212 protocol as tha standard for PC communications.

COSTS FOR modem hardware will soon drop to a point where 80 percent of the prospective buyers can afford a 212 compatible unit.

Modems as LAN Transceivers

Ona of tha most practiceble local aree network (LAN) architectures is besed on e privata branch axchanga (PBX). This is of special interest to American corporations, which ganerally own or rent PBX aquipmant, and may become large users of the PC.

There are several important advantages to tha PBX-based LAN. Node switching is already accomplisbad by tha PBX. No naw cabling or dedicatad hardware need be installad to implement the LAN. And because PBX switching facilitias and communications lines are elready in placa, tha incremantal cost to implamant tha LAN is low.

Tying the PC into the PBX with an auto-dialing, auto-answer, 212-typa modem provides sufficient horsepower for the two most common applications: electronic mail and cantral data base eccess. These generally do not involve volume data transfer, end are weli suitad to 1200-baud modam usa. An addad aconomic advantage is that LAN growth is incremental in nature with essentially no fixad start-up cost. Extra nodes simply require an additional modem/communications software package tied into the axisting PBX phone network.

WHAT IS NOW needed is a standard for asynchronous communications.

Future of 1200 Baud

This year we will see the emergance of lower cost, advanced function 212-type modems. This will stimulate 1200-baud modam use on the PC. Costs for modem hardwara will soon drop to a point whare 80 percent of the prospective buyers can afford a 212 compatible unit.

Standardization of tha communications interface will become even more important with the expected large-scale installetion of PCs in corporate offices. Becausa of Bell's considerable marketing strength, the Ball 212 is currently the industry hardware standard, a position it will probably retain.

What is now needed is a standard for asynchronous communications equivalent to the bisync protocol used for synchronous communication. IBM protocols currently dominate synchronous transmission. In the interest of standardization, I would like to see asynchronous file transfer follow the formet used in version 2.0 of IBM's asynchronous communications support peckage. If this format is adopted, all communications software couid communicate regardless of application or vendor.

Tha days of 300-baud modems are not yet gone. But 300-baud usage will be increasingly relegated to consumer home computars, whila business-oriented computing embraces 1200-baud modem. And the IBM PC will lead that trend. */PC*

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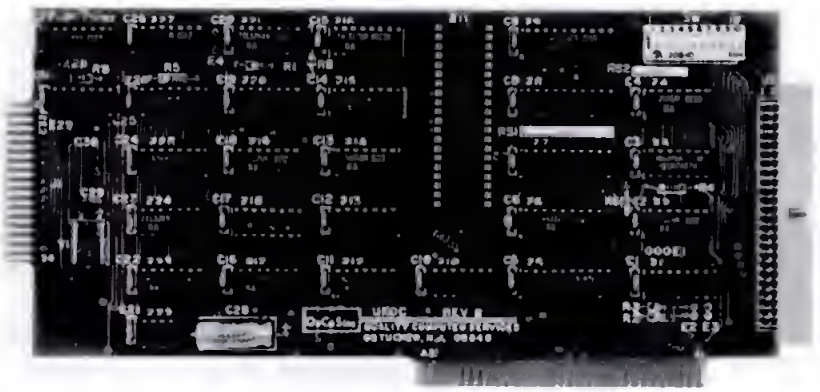

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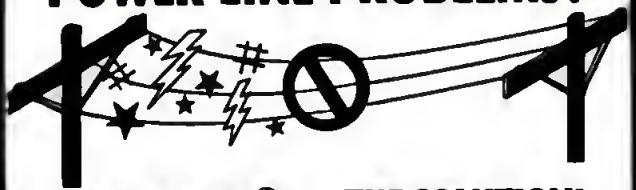

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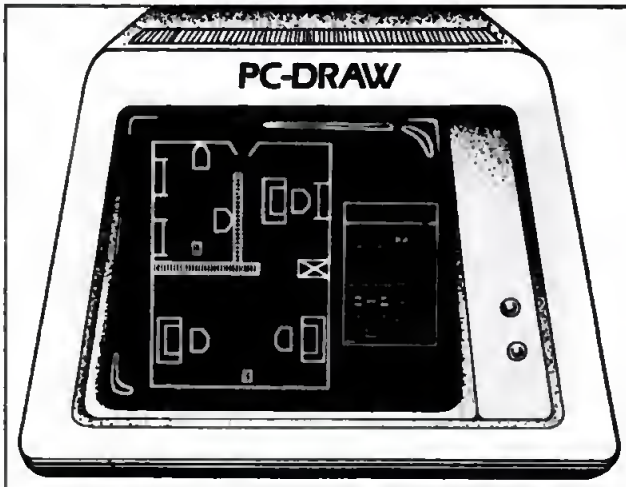

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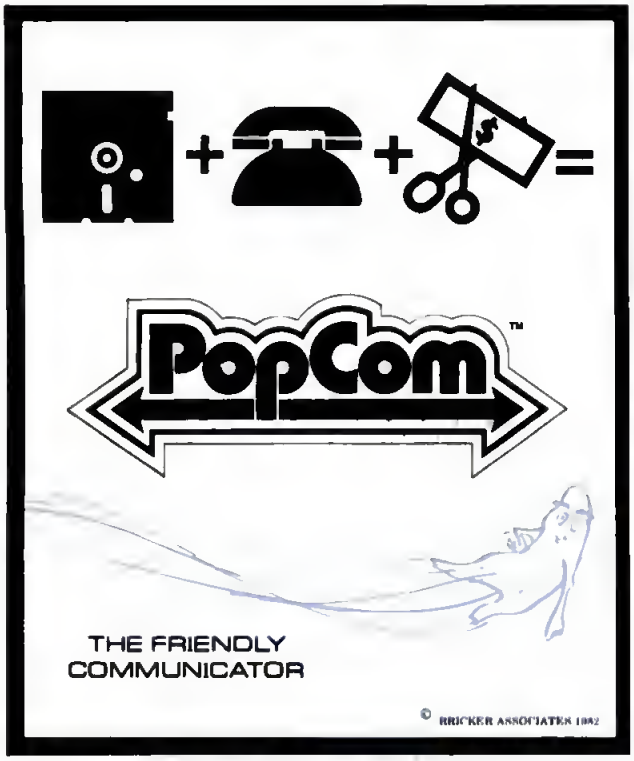

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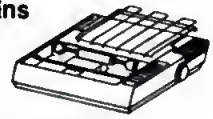

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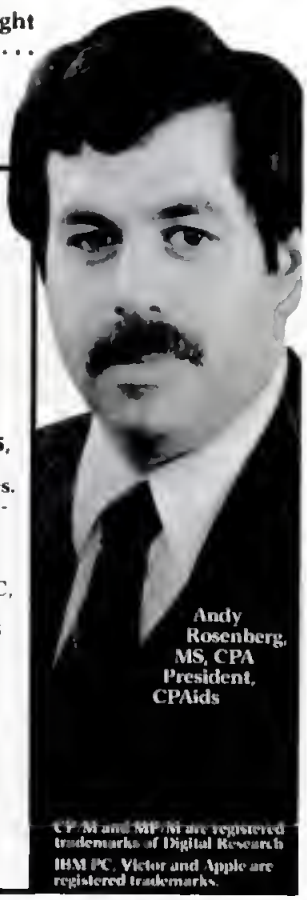

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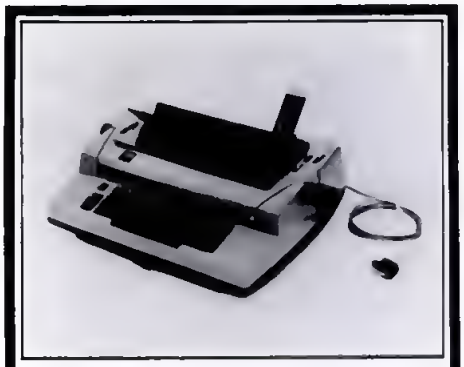

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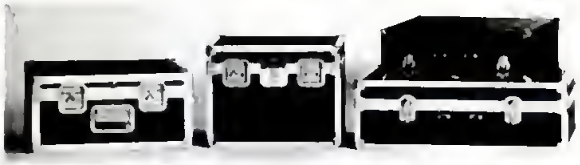

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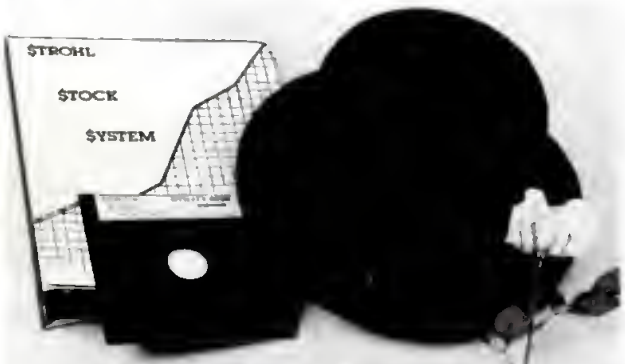

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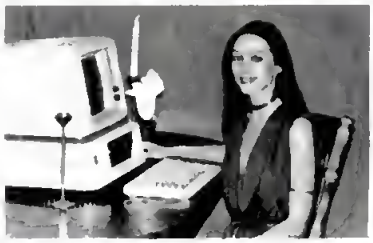

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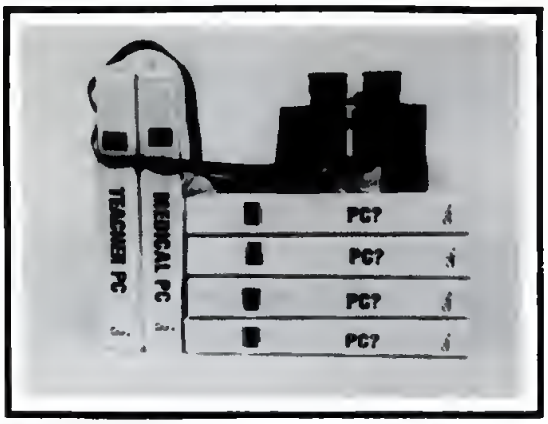

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CIRCLE 251 ON READER SERVICE CARD

Digital clocks are not enough: A simple program helps revive the familiar rite of big hands and little hands.

Learning To Tell Time With Telltime

Young Chuck Wilder wes heving trouble learning to tell time the conventional way. And no wonder: All the clocks end wetches around his house are digitel. Interpreting the reletive positions of the big hand and little hand may not be the crucial skill it once wes, but it's e treditional rite of passage. Its successful completion rewards the novice with enormous satisfection and e powerful sense of self-confidence. Remember?

Learning to read e round-faced clock seemed importent, especielly since the novice was my nephew. Before he ceme to visit last summer I designed a program called *Telltime*. After Chuck arrived, i sat

him down in front of our IBM PC and booted it up. Once he found thet it wes e very patient and friendly teacher, he spent hours at the computer. In e few deys Chuck mastered analog clocks. Other children heve elso tried Telltime with the same success.

Inside Telltime

Telltime displeys e clock on the monitor. It represents time with hour and minute hands. The program asks the child to choose the correct time from three options. If he or she selects the correct response, the clock turns into e heppy fece with superimposed eyes and a smiling mouth. The PC emits e pleasent tone and the monitor displays "Right Answer," for 5 seconds. If the child chooses an incorrect answer, the clock turns into e sad face, the computer emits e disepproving tone, and the monitor displeys the message, "Wrong Answer, The Correct Answer Is _____." The frowning clock remeins on the monitor for 10 seconds, ellowing the child to review the answer before the next problem appears.

Telltime uses the rendom number routine to select clock times. All graphics end text are drawn in medium resolution to provide larger print for children. The program incorporetes the BASIC Circle command to drew the clock. The hour and minute hands ere drawn using the arc (ellipse) option of Circle with connections to the center of the clock. Telltime adjusts the hour-hend angle to compensate for the location of the minute hand. If, for example, the minute hand points to 12, then the hour hand points directly to the hour, but for any other setting of the minute hand, the hour hand moves past the hour.

The monitor presents three possible answers after displeying the clock. For example, if the clock shows 4:10, the monitor displays "10 Minutes After 4," "20 Minutes After 3," and "10 Minutes To 4." The first choice is correct, of course. In the second case, the minute and hour hands are reversed. The third

```
100 '  *-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-*
110 '  =                                          =
120 '  =          **** TELLTIME ***               =
130 '  =                                          =
140 '  =       Written by Lloyd Onyett            =
150 '  =                                          =
160 '  =        Chehalis, Washington              =
170 '  =                                          =
180 '  *-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-*
190 '
```

continued on page 462

choice shows the correct hour, but with the minutes referring to the other side of the clock. Each set of solutions is arranged randomly.

All responses use the Inkey$ command so that the user does not have to press Enter after each response. The PC checks the user's response against the correct answer. When the program terminates, it displays a scorecard of correct and incorrect responses.

Telltime is not copyrighted, so it is presented for PC readers to use as they wish (following). It should be noted that successful execution of the program requires a color graphics adapter. The program listing can be easily modified to fit individual needs and PC capabilities. Some possible modifications include using color, using other methods to indicate time options (such as 4:10 instead of "10 Minutes After 4"), rewarding the child with a game to play after a certain number of correct answers, and playing a song instead of a single tone for correct answers. These changes would be fairly easy to add to the program; the most important considerations are simplicity and friendliness. */PC*

Lloyd Onyett teaches data processing at Centralia Community College in Centralia, Washington. He and his wife use an IBM PC at home in their computer services business. In response to local demand, they have designed and marketed a program that calculates golf handicaps.

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```
200 '  *** Setup ***
210 '
220 DEFINT A-Z:DEFSNG P
230 KEY OFF:SCREEN 1,0,0,0:COLOR 0,1
240 PI=3.141593
250 RANDOMIZE VAL(MID$(TIME$,7))
260 '
270 '  *** Randomly selects time to draw ***
280 '
290 HR=RND*12 MOD 12+1
300 MIN=(HR+RND*11 MOD 11)MOD 12+1
310 '
320 '  *** Draw graphics ***
330 '
340 CLS
350 CIRCLE (230,100),2,3
360 CIRCLE (230,100),80,1
370 H=(15-HR)MOD 12
380 HANGLE!=H*-2*PI/12+(MIN+12*(MIN>6))*PI/72
390 IF HANGLE!>0 THEN HANGLE!=HANGLE!-2*PI
400 CIRCLE (230,100),50,1,HANGLE!+.02,
    HANGLE!-.02
410 M=(15-MIN)MOD 12
420 MANGLE!=M*-2*PI/12
430 CIRCLE (230,100),70,2,MANGLE!+.02+2*PI*
    (M=0),MANGLE!-.02
440 '
450 '  *** Print title of program and
    numbers on face ***
460 '
470 LOCATE 2,17:PRINT "TELLTIME"
480 LOCATE 4,29:PRINT "12"
490 LOCATE 5,24:PRINT "11":LOCATE 5,35:
    PRINT "1"
500 LOCATE 9,19:PRINT "10":LOCATE 9,39:
    PRINT "2"
510 LOCATE 13,19:PRINT "9":LOCATE 13,40:
    PRINT "3"
520 LOCATE 17,20:PRINT "8":LOCATE 17,39:
    PRINT "4"
530 LOCATE 21,24:PRINT "7":LOCATE 21,35:
    PRINT "5"
540 LOCATE 22,30:PRINT "6"
550 '
560 '   *** Randomly arranges the time
    choices ***
570 '
580 C=RND*3 MOD 3+1
590 CH(C)=HR
600 CM(C)=MIN
```

```
610 D=(C+RND*2 MOD 2)MOD 3+1
620 CH(D)=MIN
630 CM(D)=HR
640 E=6-C-D
650 CH(E)=HR
660 CM(E)=12-MIN
670 IF CM(E) MOD 6=0 THEN CM(E)=CM(E)+6
680 '
690 '   *** Print three possible answers ***
700 '
710 LOCATE 6,1:PRINT "What time is it?"
720 FOR J=1 TO 3
730 LOCATE J*4+6,1
740 PRINT "("CHR$(64+J)")";
750 GOSUB 1290
760 NEXT
770 LOCATE 24,4:PRINT "Hit Key A, B, or C.
    (X to STOP)";
780 RESP$=INKEY$:IF RESP$="" THEN 790
    ELSE 800
790 FOR A=1 TO 300:NEXT:SOUND 18000,.03:
    GOTO 780
800 LOCATE 24,1:PRINT SPC(39);
810 ANS=(ASC(RESP$) OR 32)-96
820 IF ANS=24 THEN 1410
830 IF ANS>0 AND ANS<4 THEN 950
840 '
850 '   *** Unacceptable input rejected ***
860 '
870 LOCATE 24,1:PRINT "   A, B, or C, PLEASE";
880 FOR J=1 TO 6
890 SOUND 50*(J MOD 2+1),5
900 NEXT
910 GOTO 770
920 '
930 '   *** Acceptable input, draw eyes and
    mouth ***
940 '
950 CIRCLE (200,85),20,1-(ANS<>C),3*PI/8,5*
    PI/8
960 CIRCLE (260,85),20,1-(ANS<>C),3*PI/8,5*
    PI/8
970 IF ANS=C THEN 1120
980 '
990 '   *** Wrong answer routine ***
1000 '
1010 SOUND 40,40
1020 CIRCLE (230,200),80,1,(3*PI/8),(5*PI/8)
1030 LOCATE 23,1:PRINT SPC(6)CHR$(ANS+64);"
     IS WRONG"
```


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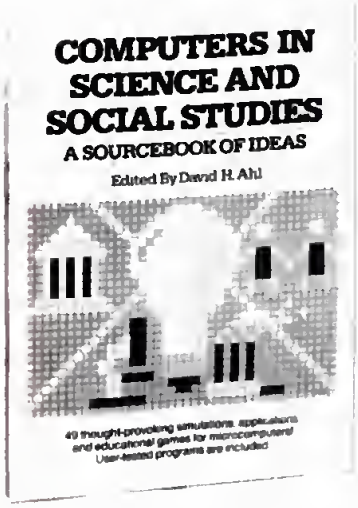
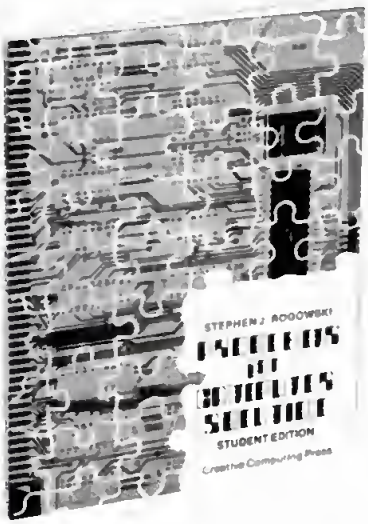
CIRCLE 239 ON READER SERVICE CARD

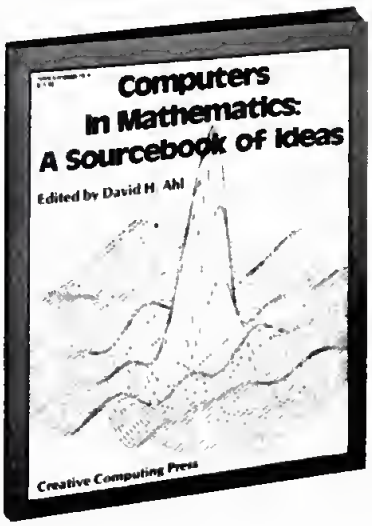

```
1040 PRINT "THE CORRECT ANSWER IS ";
     CHR$(64+C);
1050 FOR J=1 TO 4000
1060 NEXT
1070 NUMWRONG=NUMWRONG+1
1080 GOTO 290
1090 '
1100 '    *** Right answer routine ***
1110 '
1120 LOCATE 24,1
1130 J=0
1140 FLG=0
1150 PRINT "CORRECT!!!!";
1160 CIRCLE (230,100),50,2,(10*PI/8),
     (14*PI/8)
1170 FOR J=1000 TO 4000 STEP 80
1180 SOUND J,.04
1190 NEXT
1200 FOR J=1 TO 2000
1210 NEXT
1220 NUMRIGHT=NUMRIGHT+1
1230 GOTO 290
1240 '
1250 '    *** Time printing subroutine ***
1260 '
1270 IF CM(J)=12 THEN 1340
1280 IF CM(J)<7 THEN CM5(J)=CM(J):CONNECT$=
     "AFTER" ELSE CM5(J)=12-CM(J):CONNECT$=
     "TO"
1290 CM5$=STR$(CM5(J)*5)
1300 PRINT RIGHT$(CM5$,LEN(CM5$)+FLG);
     " MINUTES ";
1310 IF NOT FLG THEN PRINT:PRINT SPC(5);
1320 PRINT CONNECT$;CH(J);
1330 GOTO 1350
1340 PRINT CH(J);"O'CLOCK ";      '2
1350 RETURN
1360 '
1370 '    *** Ending program ***
1380 '
1390 IF NUMRIGHT<NUMWRONG THEN 1410
1400 LOCATE 23,1:PRINT "Very good, you
     answered":GOTO 1420
1410 LOCATE 23,1:PRINT "Too bad, you
     answered"
1420 PRINT NUMRIGHT;"right and";NUMWRONG;
     "wrong.";
1430 LOCATE 1,1
1440 END
```

IPC

For home or classroom







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IBM EYE/KATHLEEN BURTON

As the information processing market heats up, IBM looks to the 21st century—keeping one eye on the competition

Anatomy of A Colossus

In 1981 IBM launched the Personal Computer, joining the ranks of microcomputer manufacturers Apple, Tandy, and Commodore. The PC was and continues to be phenomenally successful. Today, IBM is sizing up the lucrative information processing market and making plans to feed the growing areas of office automation and home and small business computing. Having streamlined its internal operations, IBM is committed to developing new products and in fact will soon announce three new PCs—the Peanut, the Rover, and the Popcorn—that have excited much industry speculation. In this third and final part of "Anatomy of a Colossus," PC examines IBM's short- and long-term strategies, its competitors, and the climate it faces as the end of the century draws near.

To a stroller adept at dodging construction workers and weaving through a maze of scaffolding, IBM's new office building on Madison Avenue In New York appears near completion. The glassed-in Garden Plaza, verdant on a stark February afternoon, is a lunchtime haven for the plumbers and electricians adding the finishing touches. The Product Center on the ground floor is already alive with activity. Translucent blue panels have been set into the granite facade, to crown IBM's distinctive corporate logo. At a time of worldwide recession the building is a sparkling symbol of IBM's optimism and self-confidence. The race to corner a burgeoning information processing market has begun, and IBM hopes—and expects—to pull away from the crowd.

Today a $30 billion colossus, IBM is poised to move in many directions over the next 2 decades. Its success will depend on its mastery of distribution channels, its commitment to keeping products compatible and costs low, and its ability to produce software for a variety of machines.

But short-term strategy is equally important, and IBM is implementing a plan designed to ease its entrance into any market it finds attractive. The strategy combines tighter controls over produc-

Part III

Illustration: Robert Conrad

tion end distribution with an awarenass that trends must be carefully monitored and new areas explored.

IBM has recognized thet the automation of production operations is necessary todey in order to keep costs down. Sinca 1978, it hes invested over $4 billion in new plents and equipmant and hes edded some 20 million square feet of plant production cepecity throughout the world. This expansion wes essentiel as production of its increesingly popular mini- and microcomputers was stepped-up.

In addition, there heve been significant chenges in IBM's traditionel methods of distributing and marketing its low-priced products. Parsonal computers end other office products are now sold through Indapendent distributors, meil order cetalogues, and IBM-owned reteil stores—moves thet would heve been considered sacriligeous 10 years ego.

Finally, IBM is safeguarding its future by keeping an eye out for high-growth markets. It hes tergeted several developing araas that it previously ignored, principally informetlon processing, telecommunications, distributed data processing, and networking.

Over the next 10 years, IBM's strategy will touch avery facet of the information

INDUSTRY watchers predict that IBM's annual growth rate will jump from a traditional 13.3 percent to 18-25 percent by 1985.

processing business. Industry watchers predict thet IBM's annuel growth rate will jump from e treditionel 13.3 percant to 18-25 percent by 1985. Given such repid growth, its revenues could top $60 billion by then.

Todey's computar industry, howaver, is mercurial. Vendors are charging off in many directions. Computers are inveding the nontredltlonel ereas of telecommunications and information processing. Sophisticated telephone equipment now permits telaconferencing, where callers' imeges ere projected elong with their voicas. Microprocessors turn besic system units into enswering mechines, or eutometically redial numbers thet are busy. In the future, televisions will be hooked up to remote data bases, and remaining distinctions between computers end communications devices will blur and finally merge.

The PC Takes Off

The Personel Computer, stepchlld of the mini- and grandchild of the meinfreme, is just one weapon in IBM's arsenel but it hes e momentum of its own. It is likaly that IBM will expand the distribution chennels for PC products sometime in 1983. It will reportedly make the PCs eveileble to velue-added re-marketers (VARs) that serve as original equipment manufecturers (OEMs) for other IBM products such as the Deta Master and Series I computer. These VARs will then resell the PC, stepping up its distribution considarably.

in its short life the PC has attracted three distinct constituencies, and pundits predict thet over the next 2 decades the PC we know todey mey evolve into three distinct products: one figuring prominently in tha trend towerd office eutomation end executive workstations, one serving as a home entertainment and education modula, and one sarving as a stand-alone machine for the small business usar. In each of these areas, users will heve different performance expectations and levels of expertise, end hardware and softwere needs will very.

Office Automation

"Office eutometion" is the computing buzzword of tha 1980s. Its proponants believa that it will effect sweeping social chengas in the offica, transforming everything from workers' roles to the weys in which exacutives communicate. Office autometion refers proseically to the linkega of computing end communications, resulting in e shared network of information. It encompesses the disparete ereas of word processing, fecsimile (similar to a remote Xerox machine), volce simulatlon, distributad data procassing (which puts computing power et the locel site), electronic mail, locel area networks (LANs), and global area networks (GANs). It includes meinframes, peripherals, software, servicas, support, training, end medie.

The office automation market is expected to reech $155 billion by 1988 (it is now a $65 billion market, one-third of which is meinfremes). Recent acquisitions by IBM in the semiconductor and telecommunications industries signel the compeny's determination to focus on office automation in a big wey. IBM recently signed en egreement with Canade's Mitel Corporetion to jointly develop SX-2000 PBX technology, end, in Januery 1983, purchased 12 percent of Intel's common stock with en option to purchase an additional 30 percent over the next several years. The Intel purchase effectively shuts out any potentielly hostile suitors to its edvanced, state-of-the-art microprocessor chips or 4 megabyte memory devices.

IBM's present stretegy in the infent office automation market is to "get the IBM logo on executive desks," says Brian Jeffries, an analyst et Stretegic, Inc., a market research firm in San Jose, California. IBM has several edvantages over its competitors in the office eutomation race, which is geered largely to serve the Fortune 1000 corporate client. In a concentrated and focused aeries of moves since the 1950s, IBM has substantially penetrated the corporate environment, setting de focto stendarda in mainframe markets, establlishing the System/370 instruction set and SNA protocols (IBM's industry-atandard data processing architecture that enables large meinfreme computers to function es part of the same network), and locking In a loyel customer base firmly committed to IBM software. Over the years, IBM seles and support personnel have gained the trust of the data processing kingpin—the corporete menagement and Informetion systems (MIS) director—who often resents his increasing loss of control over the information flowing through his office.

However, the micro-, mini-, and mainframe traffic jam that exists in corporate office auitea today is hampering the growth of automation. No level within e company is spered from the backlaah of incompatible machines that department managers heve purchased, based on ephemeral individual preferences. IBM has attempted to right the problem, at least where its own products are involved.

In an effort to alleviete the friction between competing sales teama that were marketing overlepping product lines to the same customers, IBM decentralized its manegement structure in October 1981. Its three marketing divisions, the National Accounts Division, the National Merketing Divlsion, end the Informetion Systems Division, were reorganized along product lines.

RECENT acquisitions by IBM in the semiconductor and telecommunications industries signal the company's determination to focus on office automation in a big way.

But the traffic problem has dogged IBM since the meinframe era and will not disappear overnight. "IBM's present product line-up just doesn't meke sense," says Gregg Kelsey of the San Francisco-based venture capital firm Habrecht and Quist. "The PC, Displaywriter, and Deta Mester all compete end get in each other's wey." The problem is compounded by the fect that IBM's corporate philosophy has always been rooted in protecting its product base at all costs, even down to sidestepping new technologies that would make existing products obsolete. This is based on pure pragmatism, as software conversion for a mainframe customer is prohibitively expensive.

Esther Dyson, an enelyst In the New York market consulting firm Rosen Research, envisions that "e networked PC integrated into IBM's existing product line" will be the central focus of IBM's office eutometion stretegy. Dyson thinks IBM has already begun to make inroeda here by offering the UCSD p-System on the Displaywriter end for the PC. Office systems must operate in conjunction with eech other, she seys, and the stend-elone

paradigm of the 1980s will only be counterproductive in the networked office of the future.

A semiconductor industry spokesman predicts that the office automation market will avolva into what ha calls a "seamlass transparent network" where linked systams share filas and whare users aren't aware if information is being transferred from tha naxt room or the next state. In this natwork, he says, "you won't know where your system ends and the remote systam begins."

The Workstation of the Future

The workstation is a kay componant of an automated office. "The PC will dominata tha workstation decade," says Brian Jaffries, who predicts that it will integrate voice capability, data exchange, and graphics imaging. He believes that the workstation will incorporata tha superior traits of Xerox's Smalltalk and Star, and tha Apple Lisa. (Smalltalk is a theoretical concept refarring to a multipurpose madium that will perform a variety of functions—from programming to note-taking in a computer library.) Whila Jaffries admits that a "super" executive workstation will not become a reality for sevaral yaars, by 1990 it might include such faatures as a high-speed laser printer (with screen graphics, plotting, and color capabilities), a fax machine, and a PBX, allowing its user to "talk" globally.

OF ALL PCs SOLD in retail outlets, an astounding 50 to 70 percent ended up in homes.

The Dream and the Reality

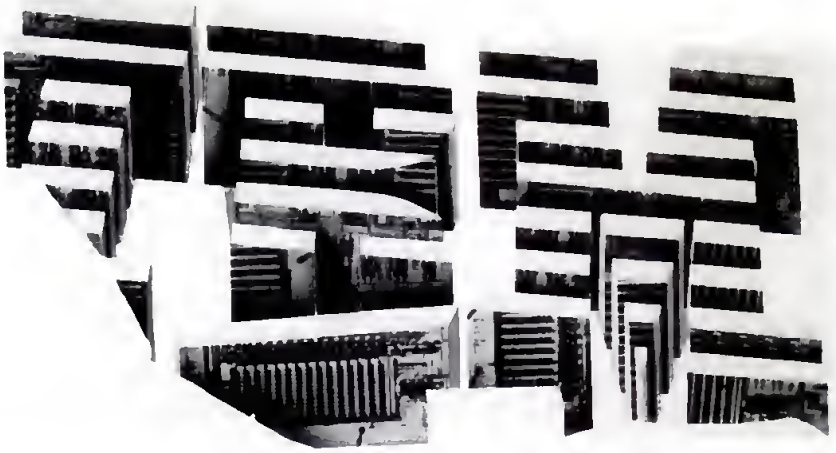
In 1983 there is a daunting gap between the dream and the reality. The office automation scenario is stalled by tha chronic lack of standards. Today's office machines share no common disk or data formats, have no standard documentation, and software quality varies widely. Information is scattered and cannot be controlled by tha data processing manager. There is a visible seam in the integration of the various machines.

In fact, a coherant office automation environment will emarga slowly, if it emerges at all. Local araa natworks, for axample, ara cryptic and incompatibla, possessing neither adequate software nor support, and Brian Jeffrias predicts that it will be at least 5 years before file transfer and electronic mail become commonplace.

But tha trend toward offica automation will snowball, says Robert Costain of DataQuest in Cupertino, California. He foresees no saturation point ahaad as davalopers respond to technological advances rathar than to any well-definad market need.

The Home Market

Ultimately, IBM hopes that the per-



Peanuts and Popcorn

News "leaks" are a rarity at IBM and nobody ever really knows what to expect. As IBM prepares to introduce three new products, speculation runs high . . .

By the end of 1983 IBM will launch Peanut, Rover, and Popcorn, three new microcomputers that will be targeted at segments of the home, small business, and corporate markets. The Peanut will retail for around $800 at mass-market outlets such as Sears, K-Mart, and Penney's. It will contain an Intel microprocessor, a single-unit keyboard, 64K on-board memory (expandable to 128K), and a built-in hard disk. The Yankee Group's Clive Smith speculates that before officially announcing the Peanut, IBM will upgrade its current PC to protect it from obsolescence. Enhancements, he says, will include increased graphics capability, system networks architecture (SNA) emulation, an improved color monitor, and increased storage.

The Rover reportedly will connect to a 3270 dumb terminal, allowing users to tap into mainframes. There are already 1.5 million 3270s and other compatible terminals in operation, making this market lucrative. Speculation about the Popcorn pegs it as a "super" computer with a powerful Intel microprocessor, a Zenix-based operating system, high-resolution color graphics, and interactive devices such as a mouse or light pen. It is expected to retail for $2,000. —*KB*

sonal computer will bring it into the home as the meinframe led it into the corporation in the 1940s. John Opel, chief executiva officer for IBM, views the home market "es ineviteble es the sunrise tomorrow." The home market is huga and growing. Analysts estimate that over two million home computers of all mekes were shipped in 1982, e figure thet is expectad to triple in 1983. A recent IBM study concluded thet of ell PCs sold in reteil outlets, en estounding 50 to 70 percent ended up in homas.

IBM is rapidly positioning itself to move more deeply into tha home computer markat end it has assessed its weeknesses with e critical aye. To gain valuable experience in a consumer-oriented high-technology fiald, IBM recently formed e joint venture with the Music Corporation of Americe (MCA), purchasing Disco Vision Associetas to program and produce video disks. In eddition to its potential es e date storege medium, the video disk will be important if the home computer merket develops es en entertainment center as well.

The home market is booming but is still not well-defined. It touches entertainment, education, finencial spreadsheets and eccounting, and consumer information services such as The Source and CompuServe. Competitors for tha home dollar hava stekad out thair territories—Atari in gemes; Texas Instruments in education; and Commodore, Tandy, and Sincleir ere targeting the entry-leval consumer. Perheps as e result of their medie seturation, the products of these companies are generally viewed as mare gadgets or expensive toys by much of the industry. By lending the credibility of its business persone to the low-end consumer market IBM mey correct this imbalanca and promote the PC in arees of home computing that heve remeined virtuelly untouched.

"Once you've got the PC in the home," speculetes Boston's Yenkee Group enelyst Clive Smith, "it can do anything—from telabanking and teleshopping to educetion." Smith thinks that IBM has a good shot et this markat since "Apple is trying to be too meny things to too many people" end the plethore of other competitors thet heve staked out a market "do not pose e serious threet."

The personel computer will become more accassible to the neophyte home user. Price reductions in the cost of integreted circuits mean that more computing power will become eveileble et lower cost. Esmund Lyons of the Stenford Research Institute in Menlo Park, California predicts thet the cost of e stenderd personel computer will plummat to $350 by 1990. Software is entering its second generetion end is bacoming chaaper end eesier to buy and usa. Recant breakthroughs in opereting system environments incorporating "desktop" end "window" metaphors, interective devices like the mouse, end graphics faatures such as on-screen icons ere smoothing trensition of the PC from the board room to the living room. Ide Cole, Director of Product Markating for the Appla II, seys thet upcoming second generetion softwera will make homa computers es eesy to use as tha telephona and "you don't have to ba an axpert to make e phone cell."

Second Generation Software

Software is bacoming less expensive end more widaly distributad. For axample, a new word processing peckage called Word Vision retails for $50 and will be sold in bookstore cheins. Cole predicts that in tha not-too-distant-future, software will be sold off recks in storas lika K-Mart end Pannay's "stuffad by rack jobbers iike L'egg boutiques." And the consumar's bastion, Computarland, recently ennounced that it will bagin markating softwara in 75 "softwara setellites," setureting shopping mells and other arees of high pedestrian treffic.

THE PERSONAL computer will become more accessible to the neophyte home user.

The Upscale Buyer

In the home market, Esther Dyson of Rosen Resaarch predicts that IBM will hold onto its image as a class outfit for the upscala cliant, "who discusses geopolitics over dinner rether then whet went on during the lest 'I Love Lucy' show."

Clive Smith agrees, and expects thet "IBM will cleim the market that everyone knows is there but few are specifically targeting." He calls it "the elite young stockbroker constituancy," thosa who will use their PCs for evarything from plotting *VisiCalc* spreedsheets to aducating thair children.

Brend identification and loyelty et the consumer level are extensions of IBM's corporate philosophy. IBM postulates that todey's sevvy video whiz kids will take their computer know-how with them to the Hervard law library end then into the rarefied etmosphere of the corporate boardroom. Brian Jeffries likens IBM to the Jesuit religious order: "If either of them gats you bafora tha aga of 7, you're theirs for life."

Small Business Systems

IBM is moving rapidly on the smell business systems front end hes elreedy garnered 35 percent of the market, eccording to Internetional Dete. The smell businass ownar is not intarastad in networking or global communicetion, but will salect e product based on image end brend identificetion, to ensure relieble follow-up support. Stores that focus on tha needs of the smell business user will flourish, like Californie's new Business-Land chain.

The needs of the smell business users diffar significantly from those of tha corporate customer. Tha owners and managers of smell business ere often novices who require patient handholding as they learn how to operate smell computer systems. Thair software peckeges are usuelly similar to those of the corporata customer, but on a smeller scele. They require e software base capable of performing antire oparations in-house, from general ladger to massage retrievel and bill paying.

Post-Shakedown Survivors

Meny industry wetchers foresee thet by the end of this decade the information business will be domineted by post-shekedown survivors IBM, AT&T, end the Jepenesa. IBM does not face substentiel competition on the homa front. Tha BUNCH, an ecronym for IBM's second-tier mainframe compatitors Burroughs, Univec, NCR, Control Dete, end Honey-

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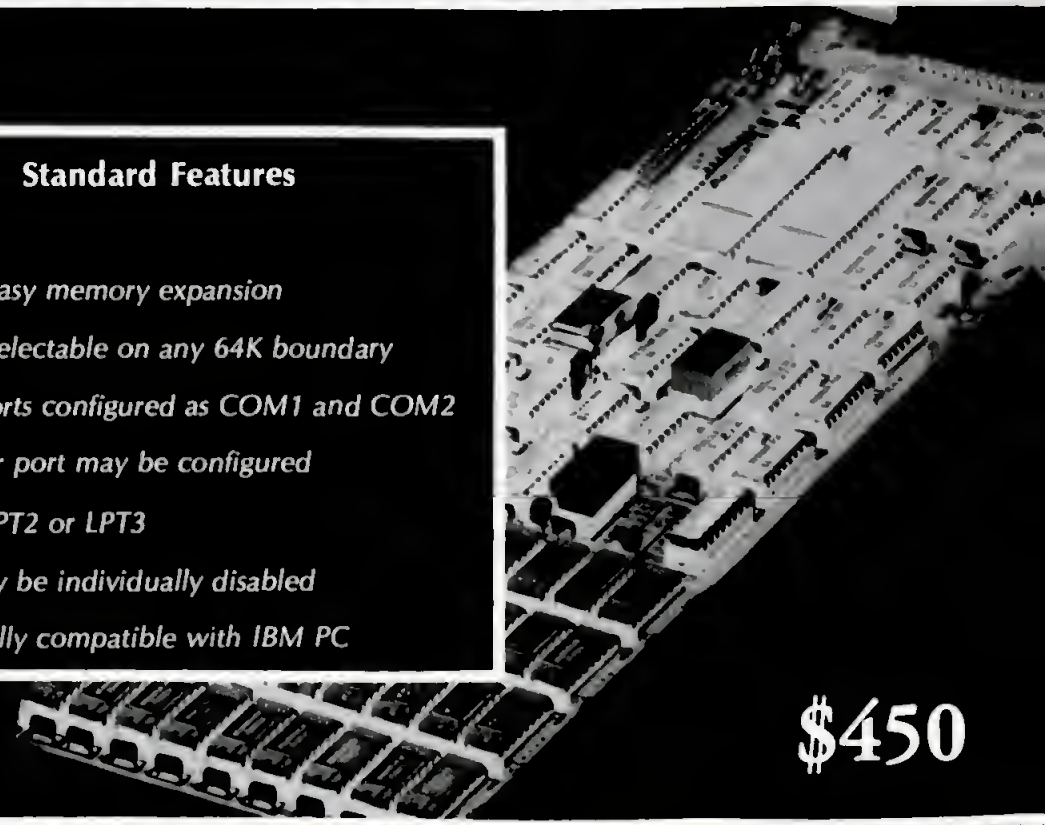

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well, do not have IBM's closa rapport with MIS directors. Likawise, microguerille competitors such es Texes Instruments, MAD Computers, and Com-Paq are only flees on IBM's corporate back. Other domestic companies—Digitel Equipment and Hawlatt-Packard in tha minicomputer area end Wang end Xarox in office products—have staked out specialized tarritories and do not pose e serious threat.

Vying with AT&T

IBM faces its major competition from e newly slaek, deregulated AT&T. Both companies will be trying to davelop tachnologias as quickly and as cost-effectively as possible. lBM end AT&T will begin to invede eech other's turf, AT&T with e line of Unix-based computers end IBM with a concentrated foray into digital PBX tachnology. In fect, the invasion has already begun. IBM and Mital will jointly develop a PBX, and AT&T has released its Antelope 3B20 and Dimension systems. The Antelope 3B20 runs Unix development systems and hes data procassing capabilities; the Dimension product is e vast multipurpose systam cepeble of energy manegement.

BRAND identification and loyalty at the consumer level are extensions of IBM's corporate philosophy.

The two compenies ere formideble. Recent legislation hes removed the shackles from IBM, once hamstrung by a 13-year antitrust lawsuit brought by the U.S. Justica Department, while tha divestad AT&T is in many ways mora powerful than before the deregulation ruling. Both will be competing for market share of products end services such es digital PBXs, intelligent terminals, satellite communications, telaconferencing, executive workstations, end vidaotext tachnology (which concerns consumar access to deta beses). Each antars the ring armed with fat R&D budgets and wide distribution networks. Decisive factors will be the relativa growth rates in crucial high-tech areas of the two compenies, and tha cost effectiveness of eech new venture.

An AT&T strength is that most American homas and businassas already have its equipment in plece. Sinca tha costliest part of natworking is the actual wiring (running a conduit or cable troughs into e building costs upwerd of $25 a foot for labor plus the cost of the cable itself), AT&T hes a definite head start.

AT&T's on-site communications equipment will prove to be another advantage as tha natworking wers heat up. AT&T derives $16 billion in revanue from this equipment, and whenever IBM sells a communications-relatad product, AT&T receives revenue from the sale. The

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reverse, of course, does not occur.

But AT&T has several weaknesses. Inured by many years of rigorous federal regulation, it may find it difficult to plunge right into the risk-taking ventures of an exploding computer industry. In addition, AT&T is an American-based company with no overseas plants, contacts, or distribution channels in place—glaring disadvantages when competing against the multinational IBM.

Other Contenders

IBM must confront two other challengers for control of the home and consumer market: a booming cable television industry, and the Japanese. In cable, entrepreneurs have been busily wiring the entire country with coaxial cable. Equally threatening is the Japanese government-industrial combine of Sony, Mitsubishi, Hitachi, Fujitsu, and Nippon Electric, which boast distributors all over North America for such consumer-oriented products as televisions, cameras, and radios.

Both groups will be in a good position in the years ahead as a concept called videotext takes hold of the home market. Videotext will integrate data processing functions with cable television, allowing users to tap into a central data base. Once up and running, videotext will permit subscribers to shop from stores, pay bills, send messages, and communicate with their neighbors—all without leaving their homes.

THE information business will be dominated by post-shakedown survivors IBM, AT&T, and the Japanese.

The government-subsidized Japanese manufacturers excel at mass producing low-end hardware and are well-positioned for economies of scale. The Japanese government recently siphoned over half a billion dollars into developing large-system software, an area in which the Japanese have heretofore been notoriously weak. They are also on the cutting edge of R&D and are designing fifth generation mainframe architectures that will incorporate artificial intelligence. Today, the Japanese have a 10 percent share of the world's computer market, a figure that is expected to triple by decade's end. Such a surge would be a serious blow to IBM, which earns 52.6 percent of its revenues from international operations.

Despite their sophisticated distribution channels in most markets abroad, the Japanese are weak in distributing and supporting their computer products in the United States. Brian Jeffries predicts that IBM will be forced to adopt a cooperative attitude toward Japan, and that each will begin to augment the other's

WHAT IS A MOUSE?

A. A small, cheese-eating rodent with a pointed snout and a long, slender tail.

B. A hemispherical, palm-sized device that attaches simply to your IBM PC through an interface adapter box; the most versatile and the swiftest cursor mover on the market; the device which, according to Byte Magazine, "....has the potential to become the most important new peripheral of the 1980s."

If you answered A .... well, you're not exactly *wrong*, but you need to come into the 20th Century. Read on, and keep in mind that when we say mouse from now on, we don't mean that old cheese-eating variety. We mean LogiMouse, the Swiss-designed cursor mover that cups to the shape of your palm. As you slide LogiMouse along, sensitive electronics sense its movement to guide the cursor on the screen in precise, lightning-fast motions. The user is not directionally limited with LogiMouse, because the cursor can swoop, dive, circle, angle—in short, it can go anywhere!

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strengths. "There's nothing genaric about their enmity," he says of the inevitable Japan-IBM shakedown.

IBM's Challenge

With its 341,279 employees, centralized management structure, 15 divisions, myriad subsidiaries, and 23 plants located in 15 countries, is IBM simply too large to cope with a changing marketplace? Will it be able to maintain the momentum of recant years?

Historically, IBM has always mustered the resources to radically change direction. In 1914 Thomas Watson Sr. saw tha opportunity to enter America's offices with a new calculator, and changed the face of information flow forever. In 1946, his son, Thomas Watson Jr., sensed tha potential of temperamental 3-ton vacuum tube computers and convinced IBM's board of directors to back his hunch. In the aarly sixties, three sanior managers bet the company's financial survival on the success of a new family of integrated products—tha 360 lina—and won. And, in 1981, IBM introduced a personal computer and the fledgling industry held its collectiva breath. So far, so good.

THE SMALL business owner is not interested in networking or global communication.

Five-Year Projection

"To project 5 years hence is the stuff of dreams," says Clive Smith. "Tha market is moving so fast and in so many different directions that, in this business, 5 years equals 50 years." John Opel has said "you can get ahead, but you can't get 10 years ahead."

It is certain that information services will play a key role in IBM's immediate future. It racently re-entered the market after a 6-year court-imposed hiatus. (Following an antitrust settlement levied against it in a 1973 Control Data Corporation suit, IBM was forcad to sell its Service Bureau Corporation and withdraw from the information services arena.) "Information servicas" is an umbrella term ancompassing such specialty niches of computing and telecommunications as data-base processing, electronic funds transfers, networking, and electronic mail. Tha fiald offers profit margins of 30 to 40 percent. Kan Churilla, a market resaarch consultant at Input Incorporatad in San Jose, predicts that by 1986, IBM's processing services vantures will generate $200 million.

Presently AT&T's Net 1 system and IBM's Information Network Services (INS) both offer remote computing capabilities. However, INS is limited to basic services such as helping users migrate to IBM systems from Honeywell or Burroughs mainframes. Tha key to the new IBM services business may be its invest-

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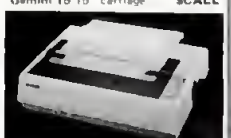
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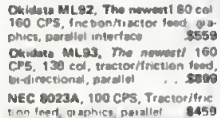
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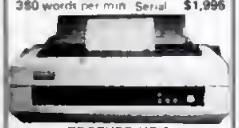
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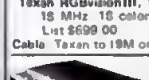
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ment in Satellite Business Systems, which designs and installs data and voice networks that transfer information via satellite between two locations. Stratagic's Brian Jaffries says that with tha advent of INS, IBM is "putting its toe in the waters of remote computing" in preparation for a more directed effort later.

In information services and othar endaavors, tha newly reorganizad IBM has several advantages ovar its compatitors. It excels at recruiting, training, and motivating personnel to market its broadaning product lines domestically and abroad. It is rich enough to purchase companies that manufacture stata-of-the-art technologias that are not cost effectiva for in-house development. And IBM, like many of its Japanese rivals, is vertically oriented, producing evarything from tiny springs to the most complex software. It is also an integrated company, capable of applying any new technology (the "master slice" logic chip, for example) across different product lines already in its stabla, from System 4300 mainframes and System/38 small business machines down to the Personal Computer.

TO PROJECT 5 years hence is the stuff of dreams; in this business, 5 years equal 50 years.

The Year 2000

Waighing all tha strengths and weaknesses of tha various corporate combatants as they mobilize for the future reveals no certain victor. Adam Osborne, designer of tha Osborne portable computer, predicts that the long-term winner will be IBM. "The magic of the IBM name touchas a narva in people," he says.

The consensus among industry analysts is that by the year 2000, IBM will be the largast multinational electronics corporation in the world. To achiave this, it must dominate the paperless office automation revolution and other rapid-growth areas. It must continua to upgrade manufacturing and production facilities, reorganiza whan nacessary, set standards, and direct mainframa architectures.

As the cost of hardware, software, telecommunications devices, earth satellltes, and earth stations declines, IBM's direction must surely changa, drivan by what John Opel calls "the limitless demand for information" coupled with the price elasticity of the computer market.

Again, thare are no sure bets. But thare is no doubt that as computers merge with telecommunications and other ambryonic technologies, nothing short of a revolution is at hand, and no facat of our lives—from how we learn to how wa travel and do business—can remain untouchad.

It recalls the ancient Chinese toast—or curse—"May you live in interesting times." International Business Machines has, does, and will. */PC*

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Austin, Texas 78750

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CIRCLE 170 ON READER SERVICE CARD

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by JANADON **$170.00**

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★Minimum Systems Requirements:

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CIRCLE 228 ON READER SERVICE CARD

New On The Market

HARDWARE

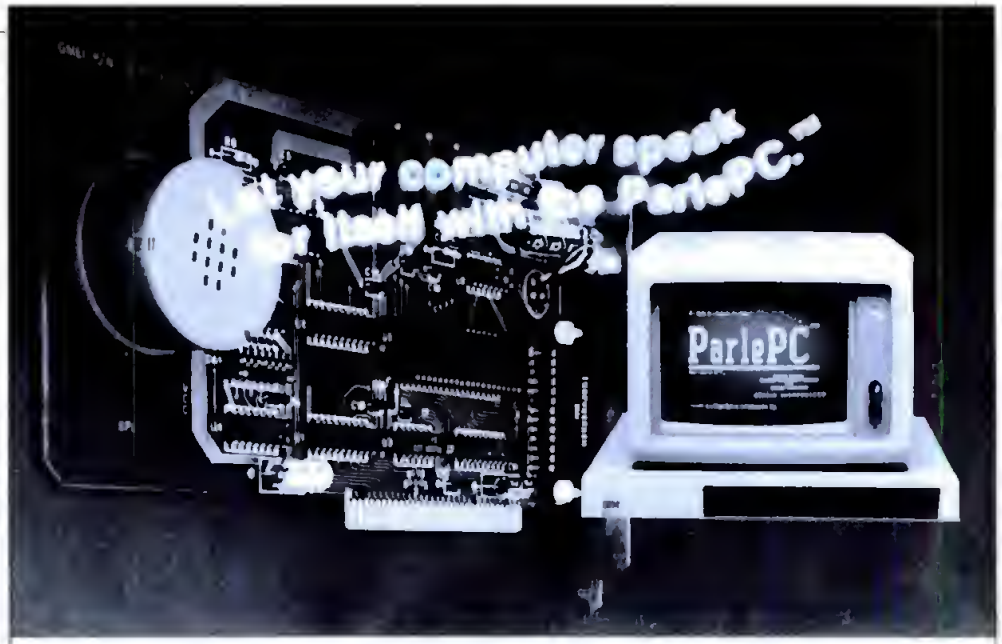
ParlePC

A programmable general purpose parallel input/output adapter with speech synthesizer that plugs directly into any available input/output slot inside the PC and operates entirely under control of user provided software.

The adapter provides unlimited vocabulary speech output for a variety of applications in office automation systems, business education, entertainment, aid to the handicapped, security control, computer aided design and manufacturing.

The ParlePC has an onboard audio amplifier, speaker and a jack for en external speaker. The ParlePC can be used with direct text-to-speech algorithms, offers external control of the speech synthesizer and can be used to synchronize external events with speech output.

The adapter has 24 general purpose TTL compatible I/O lines, programmable I/O configuration complete handshaking protocols bi-directional bus mode, signel bit set/reset capability and supports interrupt and/or software poll environments. *(List Price: $199)*
Requires: Information availabla from manufacturer.
GM Enterprise, Inc.
485 E. Granville Ave.
Roselle, IL 60172
(312) 893-1171
CIRCLE 600 ON READER SERVICE CARD



ParlePC, odapter with speech synthesizer, GM Enterprise, Inc

Mountain Hard Disk

A 5- or 10-megabyte Winchester technology bard disk system, including e RAM-disk program/Stand-alone units are compatible with standard PC-DOS commands. The interface card includes a clock which automstically sets time and date at power-up. Utility software is included to back up selected volumes or the entire disk to floppy diskettes. *(List Prices: $1,995 and $2,495)*
Mountain Computer, Inc.
300 El Pueblo Rd.
Scotts Valley, CA 95066
(408) 438-6650
CIRCLE 603 ON READER SERVICE CARD

Quarter Megabyte

A fully populeted 256K RAM board, with disk emulator software included. Full parity checking, *(List Price: $495)*
Microlog, Inc.
222 Route 59
Suffern, NY 10901
(914) 357-8088
CIRCLE 604 ON READER SERVICE CARD

8-inch Disk Drive Adapter

The PC-107 adepter board supports as many as four 8-inch disk drives, single or double density, single or double-sided. A format utility, driver source code and software to ellow transfer or files between standard 8-inch single dansity CP/M diskettes and PC-DOS diskettes is included. *(List Price: $395)*
Microlog, Inc.
CIRCLE 605 ON READER SERVICE CARD

New on the Market does not review products, but reports informotion provided by the monufocturer. If you hove o product you would like to hove included in this section, send o brief description thot includes opplicotions, price, ond system requirements to New on the Market, PC, One Pork Ave., New York, New York 10016. Photogrophs ond illustrations ore run on o spoce-ovoiloble bosis.

New On The Market

PC Modem Plus

A communications package that was designed to communicate with independent information services such as The Source and the Dow Jonas News Retrieval services.

The package which can also send electronic mail via the PC provides a microprocessor-based, auto-answer/ auto-dial 300 baud modem with a buffer, extra serial port, and high speed expandibility. Menu-driven communication software is included along with a modular phone cable. The modem is expandable to 1200 baud full duplex with the addition of a piggy-back card.

The program has a 2K memory in the modem that buffers incoming data to prevent character loss. The modem operates at both full- and half-duplex and is hardwere and software compatible with the PC. *(List Price: $369)*
Requires: 64K, PC-DOS Version 1.1.
Ven-Tel fnc.
2342 Wolsh Ave.
Santo Clora, CA 95051
(408) 727-5721
CIRCLE 601 ON READER SERVICE CARD

PC Modem Plus. *Ven-Tel Inc.*

Transtar 130

A daisy wheel printer designed to provide letter quality print and full word processing functions.

The Autoload feature is designed for the most common printing applications, such as correspondence on letterheads and drafting reports. This feeture allows the user to load single sheet paper to one of four selectable positions. *(List Price: $695)*
Tronstar, fnc.
2110-116th N.E.
Box C-96975
Bellevue, WA
(206) 454-9250
CIRCLE 608 ON READER SERVICE CARD

Transtar 20

The Transtar *20* 12-inch green monitor features a high resolution *2,000* character display for word processing, high resolution graphics, and business and sclentific uses.

Transtar has reduced the angle of its nonglare green screen to help eliminate reflections from overhead office lights. *(List Price: $169.95)*
Tronstar, Inc.
Box C-96975
Bellevue, WA 98009
(206) 454-9250
CIRCLE 609 ON READER SERVICE CARD

Transtar 315

The *Transtar 315* uses a four-hammer head with a rotating pleten to provide quality color printing. Since each of the four hammers prints only one of the four primary colors, over *30* possihle shades can he printed In a single pass of the printhead. This single hammer/single color design also keeps colors true and clean by preventing bleeding or contamination of the ribbon, often caused hy lnk resldue left on the hammer. *(List Price: $599)*
Tronstar, Inc.
2110 116th NE
Box C-96975
Bellevue, WA 98009
(206) 454-9250
CIRCLE 610 ON READER SERVICE CARD

Perfect Data Series

Cleaning and maintenance products for disks or daisy wheel printers. The Perfect Data Model 400-PX for "Phoenix type"CMD disk cartridges allows users to verify critical mechanical tolerances, as well as to clean disk surfaces. Its solution and cleaning pads safely remove contamination from disks.

Also available is the Perfect Data Type Element Cleaning Kit for keeping printer characters sharp and smudge-free. It consists of cleaning unit, pad, and bottle of solution providing approximately 25 applications. *(List Price: 400-PX $3,495; Type Element Cleaning Kit $19.95)*
Innovotive Computer Products
18360 Oxnard St.
Torzano, CA 91356
(213) 996-4911
CIRCLE 606 ON READER 5ERVICE CARD

BUFF-ET, printer buffer, Renoissonce Technology Corporation

BUFF-ET

A high speed printer buffer that can store up to 65,000 characters or about 30 average printed pages.

The copy feature allows multiple copies of a document without having to re-send it from the PC. The buffer has the ability to test itself end print out the results of the test. Power for the buffer can be taken off the printer power supply or e common AC adapter. Buffer size is available in 16K, 32K, end 64K. Tbe 16K and 32K sizes are both expandable.

Tbe buffer comes with all cabling needed to go between the PC and a parallel printer. The BUFF-ET allows other printers to emulate the IBM printer. *(List Price: 16K $249, 32K $279, 64K $329)*

Renoissonce Technology Corporation
1070 Shory Cir.
Concord, CA 94518
(415) 676-5757
CIRCLE 602 ON READER 5ERVICE CARD

UltraRAM

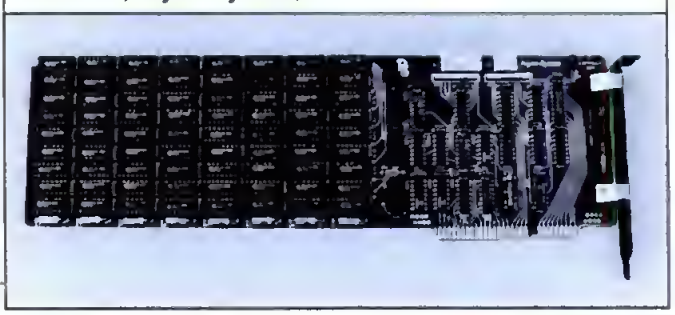
Add-on memory boards for the PC in single-siot sizes ranging from 256K to 512K bytes on a single board. Standard features include programmable start eddress, switch-selectabie on 64K boundaries anywhere in the 1M-byte address space; progremmable block enable, switch-selectable eneble/disable for each on-board 64K-byte block; parity detection circuitry with parity enable/ diseble (no latch) switch and parity elert LED; end fully expandable-socketed memory array so that a 256K board can be upgraded to 512K by adding 64K DRAMS.

UltraRAM was designed to industriel stendards and uses multi-layer printed-circuit boards. UltraRAM boards are plug-compatible with IBM RAM expansion cards. UltraRAM runs all IBM-supported software es well as many other software packeges including RAM disk evaluations. *(List Price: from $695 for 256K; to $895 for 512K)*

Requires: Information availeble from manufacturer.

Daystor Systems, Inc.
10511 Church Rood, #A
Dallos, TX 75236-9990
(214) 341-6136
CIRCLE 607 ON READER 5ERVICE CARD

Ultra RAM, Daystor Systems, Inc.



RELAY

A communications package designed to meet the needs of business users. It provides simultaneous exchange of files and messages while printing and editing locally.

The package offers full screen techniques for communicating with other users. It is menu-driven with an on-screen facility available for help questions.

Other feetures include function keys designed for use by non-typists, and error detection/correction for deta transfer in both directions. *(List Price: $69)*

Requires: 64K, Asynchronous Communications Adeptor, 160K or 320K disk drive, PC-DOS disk, IBM Monochrome Displey or 60-column color/ black and white monitor, and EIA RS232-C cable.

VM Personol Computing
60 E. 42 St.
New York, NY 10165
(212) 697-4747
CIRCLE 526 ON READER 5ERVICE CARD

New On The Market

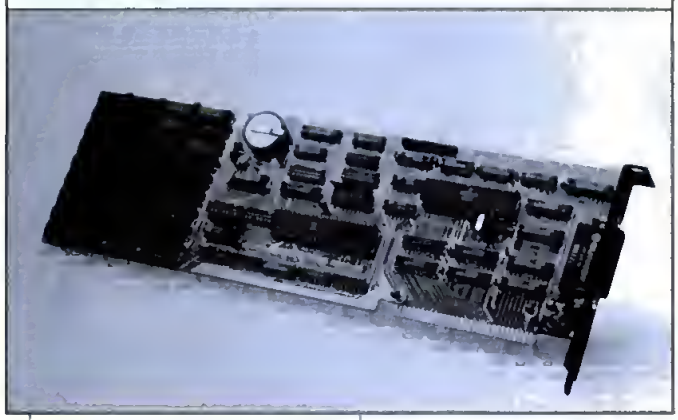
RAMPLUS

A memory expansion board that accepts up to four banks of RAM, with each bank configured as eight data bits and one parity bit. The memory banks are designed to accept either 64K or 256K RAM chips. Total memory capacity is 256K bytes using 64K RAM chips and one megabyte with 256K RAMs.

The board contains error detection logic and can be enabled or disabled with a DIP switch. Other functions include serial port, parallel port, and clock/calendar with battery backup. *(List Price: From $575, includes operating software)*

Roytronics
4901 Moreno Blvd.
Building 900
San Diego, CA 92117
(800) 854-1085,
(619) 270-4000
CIRCLE 525 ON READER SERVICE CARD

RAMPLUS, Roytronics



SOFTWARE

Cosmic Crusader

A PC game from the publisher of *Snack Attack II*. Sound effects and color graphics involve the user in the "Battle to Save the Earth." Joystick or keyboard, start/stop and sound toggle keys, user-configurable controls, and multiple levels of play. *(List Price: $38.95)*

Requires: Color/graphics adapter.

Funtastic, Inc.
5-12 Wilde Ave.
Drexel Hill, PA 19026
(215) 622-5716
CIRCLE 612 ON READER SERVICE CARD

Name and Address List Management System

A user-friendly system that manages name-and-address lists. Will print listings and labels either one or two across. Listings can be selected by state, area code, exchange, zip code, or a user-defined code. *(List Price: $29.95. Documentation only, $3.95, refunded on purchase.)*

Requires: 64K, 80-character display.

M & J Automation
P.O. Box 205
Pleinsboro, NJ 08536
CIRCLE 615 ON READER SERVICE CARD

VEDIT 1.37

An enhanced version of the *VEDIT* full screen text editor that features a disk directory display, ten text buffers for "cut and paste" functions, command macros which can be saved and loaded from disk.

Existing features include status line, unlimited file handling, automatic disk buffering for files larger than memory, special facilities for programming in structured languages and assembler, word wrap and paragraph formatting.

Users can recover from accidentally running out of disk space and can change disks while editing. *(List Price: $150 to $195)*

Requires: CP/M-86 or MS DOS.

CompuView Products Inc.
1955 Pauline Blvd.
Ann Arbor, MI 48103
(313) 996-1299
CIRCLE 626 ON READER SERVICE CARD

Generic CP/M Programs

Four software programs that produce a variety of multicolor graphics on any CP/M based system using a Strobe 100 graphics plotter.

The graphics programs can be used on any system supporting a CP/M 2.2 operating system and MBASIC language with 64K memory, an RS-232 port and one disk drive.

The four programs include *Business Graphics I*, for producing pie and bar charts, *Business Graphics II* for line charts and logarithmic nonlinear scales, *Stroveview*, a menu-driven package for producing flow charts and organizational charts and a program for dealers to demonstrate Strobe graphic capabilities on CP/M based computers. *(List Price: Available from manufacturer)*

Requires: 64K, one disk drive, RS-232 CP/M 2.2

Strobe, Inc.
897 Independence Ave.
Mountain View, CA 94043
(415) 969-5130
CIRCLE 625 ON READER SERVICE CARD

VED/86

VED is a screen editor developed for the 8086/8088 end other MS-DOS systems. VED eutomatically adjusts to the screen width in use (40/80 columns).

Commands are invokad by a single (mnemonic) keystroka with a status/remindar line at the top of the screen. The screen displays the current contents of tha file baing edited.

A "help" function displeys ell valid commands as well as status information, such as remaining buffer spece, positions of usar's merkars, and current search and replace strings. The effect of most commands may be "undone" by pressing the escape key.

The VED user's guide features a tutorial saction that helps femilierize the user with tha most commonly-used commands. *(List Price: $79.95)*

Requires: 9K for code, MS-DOS (any version), video terminal with directly addressable cursor (for non-PC systems).

Westcoost Softwore
P.O. Box 65869 Stotion F
Voncouver, B.C.
Conodo V5N 5L3
CIRCLE 634 ON READER SERVICE CARD

MultiLink

Interfaces with PC-DOS, turning it into a sophisticated multi-usar multi-taking oparating systam. Additionel users can be at es many as eight CRT terminels attached to serial perts on the PC, or through TTY terminals or other computars. The terminel users have the same general capabilities as the operator of the mein console. *(List Price: $275)*

Requires: 64K, one disk drive.

The Softwore Link, Inc.
6700 23-B Roswell Rd.
Atlanta, GA 30328
(404) 255-1254
CIRCLE 631 ON READER SERVICE CARD

IOAS

An integrated office eutomation program consisting of a date base manager, en applicetion system, a word processor, graphics, and spreed sheet interfece for the PC.

The program is sold in separata modules. Usars can salect modules, such as the word processor, report writer, or screen writer, as needed.

The *IOAS* program modules include: EXEC-I, an executive informetion system consisting of 7 epplications: appointment, stock security, mailing list, check, personal financa, personel inventory and memo.

IDM-X, an interactive data base manager. The Screen Writer, the WORD-X word processor with full screan editor.

A 25 parcant discount is aveilable after purchese of the first module. *(List Price: $198 EXEC-I, $398 IDM-X, $198 Screen Writer, $98 WORD-X)*

Requires: 64K, two disk drives, DOS, 132-column printer; 96K required for word processor module.

Micro Architect Inc.
96 Dothon St.
Arlington, MA 02174
(817) 643-4713
CIRCLE 616 ON READER SERVICE CARD

iOAS, Micro Architect Inc.

New On The Market

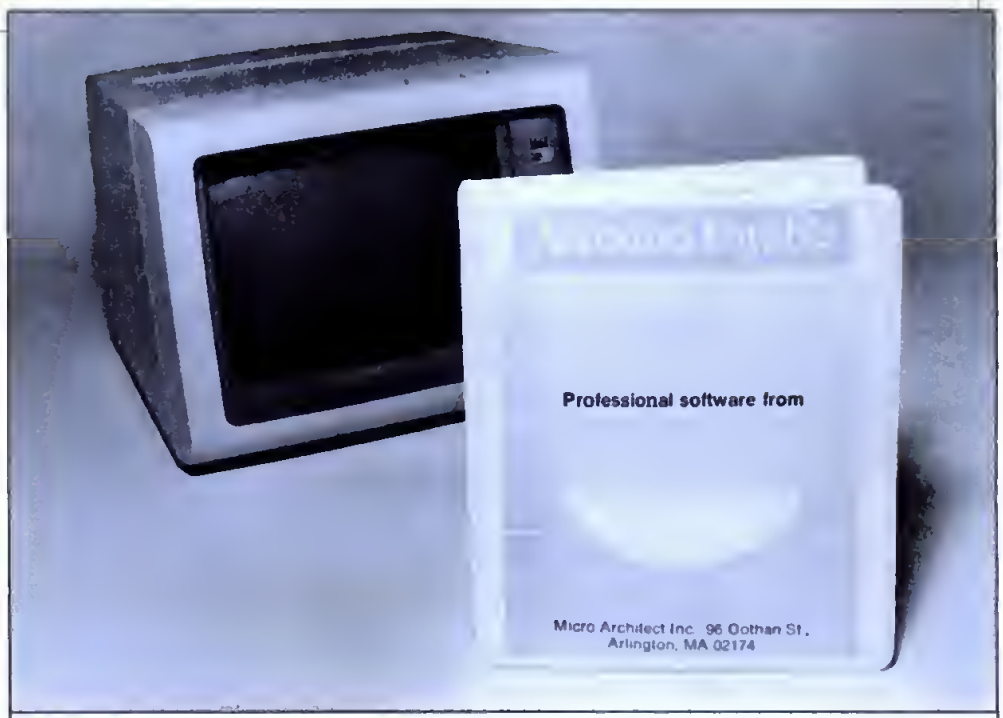
AP

A menu-driven accounts payable system that keeps track of current and aged accounts payable. The system incorporates programs to meintain a complete record for each vendor, helps determine which vouchers to pay by due date or discount dete, or within certain cash requiremants, and prints checks automatically.

The program also forecasts cash requirements based on discount dates or due detes and ages past-due payeble. *(List Price: $248, manuol only, $22)*

Requires: 64K, two disk drives, monochrome displey, 132-column printer, PC-DOS.

Micro Architect Inc.
96 Dothon St.
Arlington, MA 02174
(617) 643-4713
CIRCLE 617 ON READER SERVICE CARD



AP, Micro Architect Inc.

Lazer Maze

You are trensported to the 24th century, a time when traditional warfare has become obsolete. Instead, disputes are settled in a form of one-to-one combat in the Arene of Final Reconcilietion, a rectangular area with 40 two-digit numbers around the perimeter. The object of the conflict is to fire your lesar gun and predict where the beam will exit after reflecting off one or more angled mirrors in the arena. *(List Price: $29.95)*

Requires: 48K, Color/graphics adapter.

Avont-Gorde Creotions
P.O. Box 30160
Eugene, OR 97403
(503) 345-3043
CIRCLE 618 ON READER SERVICE CARD

AR-I

AR is e menu-drivan invoicing and monthly statement ganerating system that keaps track of current and eged eccounts receiveble. AR supports three types of accounts: open balance, balance forward, and auto billing. *(List Price: $248)*

Requires: Monochrome display, two disk drives, 64K, 132-column printer.

Micro Architect fnc.
96 Dothon St.
Arlington, MA 02174
(617) 643-4713
CIRCLE 633 ON READER SERVICE CARD

Participative Management Skills

A series of interective tutorial programs thet were designed to increase employee-menagement communications and business productivity.

The course can be used by either non-profit or productivity-oriented businesses. Supervisors can learn weys to improve communication, increase productivity and job satisfection. *(List Price: $249.50)*

Requires: 64K, one disk drive, monochrome monitor, PC DOS.

Duosoft Corporation
1803 Woodfield Dr.
Sovoy, IL 61874
(217) 356-3111
CIRCLE 619 ON READER SERVICE CARD

HVAC Software

Programs for duct end pipe sizing, solar heeting design, and calculation of residential and commercial cooling and heating loads. *(List Price: $350)*

Requires: 128K, two disk drives, 132 column printer, and VisiColc.

E. Jessup, Mechanicol Engineers
4977 Conogo Ave.
Woodlond Hills, CA 91364
(213) 883-9021
CIRCLE 635 ON READER SERVICE CARD

BRUISER and BLISTER

BRUISER (BASIC Program Remarks Removal Utility) and *BLISTER* (BASIC Program Listing Utility) are designed to facilitate program documentation procedures.

The *BRUISER* Utility scans a user-specified program, copies it to another user-specified file, and removes all comments and REM statements, producing a copy of the program that contains only the executable BASIC code.

The *BLISTER* Utility provides the user with a readable program listing without searching the text. *BLISTER* parses out the defining statement numbers from the statements that overflow a single line and the program comments. It also provides the program name, date, and time, along with the listing itself.

The *BLISTER* Utility allows the user to perform pagination. In addition, the page number, program version number, title, and multiple subtitles can be printed at the top of the page. By starting a new page each time a new subtitle is encountered, the user can segment the program into various functional pieces. *(List Price: $15 each; $25 for both)*

Requires: 64K, one disk drive (BLISTER only), 80 column printer.

Diversified Data System, Inc.
5227 Buchonon Rd.
Delray Beach, FL 33445
(305) 498-2772
CIRCLE 632 ON READER SERVICE CARD

Moneytrack

A money management program that can maintain complete transaction records for small businesses, investments or the users' personal accounts. The program prepares a variety of reports to help meet the requirements of financial institutions and the Internal Revenue Service and can print checks on different check forms.

Moneytrack comes with its own operating system and can be implemented by novice users as no knowledge of programming or computers is needed.

The program can be used by small business owners, farmers, investors, accounting firms, financial advisers, business managers, and professionals such as doctors and lawyers. *(List Price: $450)*

Requires: 64K, two disk drives. A printer is recommended.

Pocific Data Systems Inc.
8090 Sepulvedo Blvd.
Culver City, CA 90230
(213) 559-8713
CIRCLE 623 ON READER SERVICE CARD

Business Analysts Series

A series of personal business computer software programs that can be integrated as the user needs. Each program module provides business managers with specific task management facilities and the ability to relate on application to another in the series. The series runs under the Executec Software Bus which acts as an interface between the non-technical user and the software to provide common commands, procedures, sign-ons, and security.

included in the series are an Integrated Spreadsheet, Integrated Text Processing, Personal Records Menagement and Communications.

The bus allows these applications to be transportable between computers. They can also be expanded. The bus comes with the Personal Records and Integrated Text Processing modules installed. *(List Price: Bus $450, modules $450 to $1,300)*

Requires: 64K, two disk drives. A printer is recommended.

Executec Corporotion
12200 Park Central Dr.
Dallos, TX 75251
(214) 239-8080
CIRCLE 622 ON READER SERVICE CARD

FLIP-ELLO

A game similar to the Othello board game that can be played on either a cassette-besed PC or on a PC equipped with a floppy disk. Pleyers can match skills against the PC or use the computer as the playing board for two players.

The program will automatlcally flip all the correct pieces and keep score. At any polnt during the game players can switch sides with the PC, ask for a suggested move or quit the game. The board is displayed along with remeining pieces and the current score. The program will also comment on particularly good or bed moves. *(List Price: $12.50, plus $2.50 shipping and hondling)*

Requires: 16K, one floppy disk, for cassette-based system. 8K for other systems.

RESUBA DIGITAL SYSTEMS
P.O. Box 440, Dept. 8
Blockwood, NJ 08012
(609) 228-5688
CIRCLE 620 ON READER SERVICE CARD

Graphics Utility

Can be used as a stendalone graphics generator or to display various character sets from a BASIC program. Shapes are created and edited on an enlarged grid with the actual size shape displayed to the side. Shape size is variable up to 39 by 39 pixels. *(List Price: $55.00)*

Requires: 64K, PC-DOS, color/graphics card

Sovont Softwore
P.O. Box 42888
Houston, TX 77042
(800) 231-9900
(713) 558-8363
CIRCLE 651 ON READER SERVICE CARD

New On The Market

Copy] [PC

A disk backup system that copies both protected and unprotected software. The program verifies the disks it creates and does not modify data. Available memory is utilized to lessen copying time. A drive speed utility is also included to aid users in spotting drive problems. *(List Price: $39.95)*

Requires: 48K, one disk drive.

Central Point Software
P.O. Box 19730, #203
Portland, OR 97219
(503) 244-5782

CIRCLE 643 ON READER SERVICE CARD

Emulation Program

A program that enables the PC to communicate with Data General computers. The assembly language program emulates the special screen and keyboard of a Data General D200 CRT terminal. The PC can access the full range of application programs for Data General computers as a terminal when connected over an asynchronous link. *(List Price: $150, includes program license, documentation, and update service)*

Requires: 64K, one disk drive.

Space-Time Labs
SR 20850
Fairbanks, AK 99801
(907) 479-4540

CIRCLE 644 ON READER SERVICE CARD

PFS:FILE and PFS:REPORT

PFS:FILE and *PFS:REPORT* are two information management programs. Like a paper filing system, *PFS:FILE* records, files, retrieves, and summarizes information. It allows the user to organize information on forms created on the computer screen. Once the basic form has been created, *PFS:FILE* can sort by any item on the form and search for a numeric range, wild card, or opposite match. Files can be sorted or merged, even if their form designs differ, and form designs can be changed without re-entering the data.

PFS:REPORT sorts, calculates, formats, and prints reports using the information contained in *PFS:FILE*. *PFS: REPORTS* prints up to 16 columns per report, including three calculated columns. Totals, subtotals, averages, subaverages, counts, and subcounts can be printed on every column. *PFS:REPORT* has comprehensive sorting capabilities plus automatic page numbering, title printing, and centering. Eight pre-defined report formats can be saved for repeated usage, and column headings can also be changed and saved. *(List Price: PFS:FILE—$140; PFS:REPORT—$125)*

Requires: Information available from the manufacturer.

Software Publishing Company
1901 Landings Dr.
Mountoin View, CA 94043
(415) 962-8910

CIRCLE 679 ON READER SERVICE CARD

Optioncalc

investment planner calculates the theoretical values for put-and-call options according to the Black and Scholes model. Program will calculete the value for the put-and-call option selected, the exact expiration date, the number of days to expiration, the hedge ratio, and the put-and-call symbols. Additional "what if" calculations can be performed by changing entries. *(List Price: $85.00)*

Requires: 64K, PC-DOS, color/ graphica card.

Sovant Software
P.O. Box 42888
Houston, TX 77042
(800) 231-9900
(713) 556-8363

CIRCLE 650 ON READER SERVICE CARD

UltraFAST

A disk RAM emulator that can overlay disk drives. Sizes from 6K to 320K per drive are configurable, depending upon RAM available. Also included is a parity handler which processes parity errors and clears all but hard errors. *(List Price: $39.95)*

Daystor Systems, Inc.
10511 Church Rd., #L
Dallos, TX 75236
(214) 341-8136

CIRCLE 653 ON READER SERVICE CARD

Tax Planner

A software program to help reduce personal tax liability through annual planning. Based on user-definable tax tables beginning with 1982, it computes tax schedules plus Schedules G, 4972, 4625, 8251 and sales tax tables. As many as four client data files can be handled at once—the first to hold current data, m additional files to contain assumed data changes. In addition, as many as four different assumption data files for a given year and tax calculations for four different years can be programmed. *(List Price: $300)*

Requires: 64K, printer

CPAids
1061 Fraternity Circle Dr.
Kent, Ohio 44240
(216) 678-9015

CIRCLE 652 ON READER SERVICE CARD

Bibliography

A program that compares citations in a manuscript with entries in a card catalog to construct a bibliography of all cited entries.

The program was designed for use by professional writers. Entries are added to the catalog using a text-editor. The program can copy entries from the catalog to footnotes in a manuscript, or replace citations in the manuscript with numbers corresponding to the order in which the works appear in the bibliography. *(List Price: $125)*

Requires: CP/M-66 or PC-DOS

Digital Morketing
2870 Cherry Ln.
Wolnut Creek, CA 94598
(415) 938-2860
TELEX 17-1852 (DIGMKTG WNCK)

CIRCLE 645 ON READER SERVICE CARD

PC/HELP

A help program that displays information about PC-DOS commands on-screen.

The purpose of each command is explained, correct syntax is shown and examples of command usage are provided. For most commands hints are also displayed.

Novice users can see the command syntax and examples on the display without having to refer to a manual. Experienced users can use the program as a quick reference for infrequently-used commands or where special syntax is required.

The program can be used on any PC that uses PC-DOS.

(List Price: $29.95)
Relotional Solutions, Inc.
5857 S. Gessner, #103
Houston, TX 77036
(713) 972-1800
CIRCLE 647 ON READER SERVICE CARD

VersaForm Application System

Versaform is an office environment data base capable of processing common paper business forms and producing reports from any set of data contained within a file of forms. The first two application systems templates are the Purchase Order and the Legal Office Manager templates.

(List Price: $389)
Requires: 126K.
Applied Software Technology
14125 Capri Dr.
Los Gatos, CA 95030
(408) 370-2662
CIRCLE 654 ON READER SERVICE CARD

Bizi-Calc, El Dorado Software

Bizi-Calc

A general business and accounting program that runs in conjunction with electronic spreadsheet programs. Novice users can quickly access, learn about, and use their PCs.

The program allows users to create forms for use in bookkeeping, forecasting, personal expenses, and bank reports.

The program is part of a series of business and tax programs from the manufacturer.

(List Price: $50)
Requires: *SuperCalc, VisiCalc, Multiplon, UltraCalc.*
El Dorado Software
P.O. Box 1235
Shingle Springs, CA 95662
(916) 626-6562
CIRCLE 630 ON READER SERVICE CARD

Crush, Crumble and Chomp!

A movie-monster game which lets the player assume the role of any of six hungry man-eating beasts in one of more that 100 scenarios. The player can choose to wreak havoc on New York, San Francisco, Tokyo or Washington, D.C.

(List Price: $29.95)
Requires: 64K, BASICA, color/graphics board.
Automoted Simulotions/EPYX
1043 Kiel Ct.
Sunnyvole, CA 94066
(408) 745-0700
CIRCLE 656 ON READER SERVICE CARD

Micro LawPack

A financial-management system for firms using a spreadsheet model to compare a budget with actual financial data. The system allows a firm to do partnership profitability reporting without using the firm's primary computer. The program is totally integrated with the *LawPock* system for large law firms.

Use of the VisiCalc spreadsheet allows users to change the model or any variable in order to analyze the effect of a proposed financial decision. Extensive documentation is included. An on-line "HELP" feature allows the user to receive any necessary assistance without a delay in processing.

(List Price: $1,000)
Requires: 256K, two floppy disk drives.
Computer Information Consultants
1860 Broadway
New York, NY 10023
(212) 246-7340
CIRCLE 673 ON READER SERVICE CARD

New On The Market

Air Traffic Controller

A simulation program that puts the user in charge of all the incoming traffic at a major metropolitan airport. Users must direct the runwey approaches and landings, monitor planes on the radar screen, radio commands to all pilots to increase or decrease altitude or change direction. Users may even have to hendle an occasional bijacking or UFO. *(List price: $29.95)*

Requires: 48K, monochrome or color/graphics edapter.

Avant-Gorde Creations
P.O. Box 30180
Eugene, OR 97403
(503) 345-3043
CIRCLE 648 ON READER SERVICE CARD

Pro Football Game

A simulation of a professional footbail contest, including ten offensive plays, five defenses, interceptions, fumbies, penalties, punts, safeties, fieid goals, touchdowns, extra points, and time outs. The screen displays the playing field and scoreboard. Users can go against the computer or another player. *(List Price: $23.75)*

Requires: 64K, 80-column dlsplay, BASICA, PC-DOS, Color/graphics adapter and monitor optional.

Strotegic Alternotives
459 Homer, #2
Polo Aito, CA 94301
CIRCLE 649 ON READER 5ERVICE CARD

Jabbertalky

A programmable word game for one or more players, including Alphagrammer, an anagram game and Cryptogrammar, a code-breaking game. A special utility program, Jabbergrammar, stores iists of words for each part of speech, and players can also create lists of their own. The program can also create free verse, randomly constructing grammatically correct sentences that give hints about the kinds of sentences generated for each skiil ievel. *(List Price: $29.95)*

Requires: 64K, BASIC.

Automoted Simuiotions/EPYX
1043 Kiel Ct.
Sunnyvole, CA 94086
(408) 745-0700
CIRCLE 657 ON READER 5ERVICE CARD

Star Warrior

The second game of the Starquest series, this science fiction/fantasy game sets up the player as an interplanetary avenger taking on an entire planetary occupation force of troopers and vehicles. The player is armed with electronic direction-finding equipment, decoys, missiles, and guns, and can walk, jump, or even fly over swamps, forests and mountains. *(List Price: $39.95)*

Requires: 64K, Color/graphics board, BASICA, PC-DOS.

Automoted Simuiotions/EPYX
1043 Kiel Ct.
Sunnyvole, CA 94066
(408) 745-0700
CIRCLE 658 ON READER SERVICE CARD

Fas-File

Written in UCSD Pascal, Fas-File combines user-definable record formats, easy-to-use fill-in-the-form input, a select option and user-definable reports. A record may contain as many as 36 fields totaiing more than 500 bytes of data. in addition, more than 100 keywords may be used to cross-reference each record. *(List Price: $145)*

Gryphon Systems
922 Gronge Hoil Rd.
P.O. Box 755
Cordiff-by-the-Sea, CA 92007
(619) 436-1455
CIRCLE 655 ON READER 5ERVICE CARD

AutoCAD

A two-dimensional computer-aided drafting and design software package, suitable for architectural and landscape drawings, mechanical, electrical, chemical, structural, and civil engineering uses, and printed-circuit design. System supports Summagrapbics and Houston Instruments digitizers as well as Hewiett-Packard and Houston Instruments plotters. *(List Price: $1,000)*

Requires: 128K, monochrome and color/graphics card.

Autodesk, Inc.
16 St. Jude Rd.
Mill Volley, CA 94941
(415) 361-1819
CIRCLE 659 ON READER SERVICE CARD

TAXMODE

A menu-driven tax-planning system for individual income taxes. The system computes federal taxes for 1962 and iater years, including the TEFRA provisions of 1982 and inflation-indexing beginning in 1985. Results are continuously displayed on the input screen and updated after each new entry. Several alternative computations can be displayed at the same time. Multipie report formats allow printing of reports to fit individual user requirements, including all the major IRS forms. Multiple options to compute state income tax are available. *(List Price: $299.95)*

Requires: 96K, monochrome dispiay, printer.

Sowhney Software
866 Seventh Ave.
New York, NY 10106
(212) 541-8020
CIRCLE 665 ON READER SERVICE CARD

DDQUERY

A database management system with query, report writer, and transaction processor, the program automatically links related data items for access. A Schema subsystem is used to define the data base and estabiish item and set relationships. The report writer is capable of reporting data from as many as five data sets and a transaction processor allowing the user to design CRT screen forms for data input, modification, display, processing and data set updating. *(List Price: $7,500)*

Gemini Informotion Systems
5500 South Syracuse Circle
Englewood, CO 80111
(303) 773-1805
CIRCLE 660 ON READER 5ERVICE CARD

Federation

The pleyer ls commander of a Federation Starship ln this arcade game. The assignment is to wipe out the invading Drorn Drones who have taken over a mining colony and are defending it with various cannons and bombs. Using keyboard commands, the player must move his ship up, down, left or right to evoid enemy fire as well as to dispatch his own weapons. *(List Price: $29.95)*

Requires: 48K, Color/graphics adapter.

Avant-Garde Creations
P.O. Box 30180
Eugene, OR 97403
(503) 345-3043

CIRCLE 661 ON READER SERVICE CARD

PC Create

A program generator which writes BASIC programs to maintain a random access file built to the user's specifications. Owners can add their own application modules. *(List Price: $50)*

Requires: 64K, one disk drive

Data Transport Systems, Inc.
347 Eost 62nd St.
New York, NY 10021
(212) 888-6931

CIRCLE 662 ON READER SERVICE CARD

RAMPRINT

A printer-buffer program. *RAMPRINT* captures all data belng sent to the parallel printer port and stores it in a memory buffer, from which it is automatically sent to the printer while the CPU program continues running. No alterations to DOS or additional hardware are needed. A single command, which can be automatically executed, activates *RAMPRINT* and sets the size of the print buffer (from 1 to 64K), which is dynamically allocated in user memory.

The program is designed to operate invisibly to the application program. It has been used successfully wlth DOS, BASIC, BASIC Compiler, *Easy Writer*, WordStor, CP/M, *VisiCalc*, Macro Assembler, COBOL Compiler, and more. *RAMPRINT* has a quick start-up and the following keyboard command features: PrinterPeuse (temporarily suspends printing), Clear Buffer (clears buffer of all data), Video Display Disable (blanks the display whlle the system ls unattended), and Stop List Enhancement (a slngle key can slow/pause/resume video output. *(List Price: $49.95)*

Requires: Information available from manufacturer.

STB Systems, Inc.
1701 N. Greenville, #703
Richardson, TX 75081
(214) 234-8750

CIRCLE 669 ON READER SERVICE CARD

RM/COBOL

An ANSi 74 standard COBOL compiler available under the CP/M-86 and PC-DOS. All existing commercial software using RM/COBOL will run on the PC. *(List Price: $950)*

Requires: 64K, two disk drives.

Ryan-McFarlond Corporotion
609 Deep Valley Dr.
Rolling Hills Estotes, CA 90274
(213) 541-4828

CIRCLE 666 ON READER SERVICE CARD

Ultimenu-II

A system that provides single-keystroke control for one primary menu and an unlimited number of secondary menus. Each static menu can contain up to 38 programs, batch files, or dynamic-menu entries. A 30-character descriptlon of each entry and the current time and dete are continuously displayed on each static menu. Dynamic menus list ell or a subset of the files on any currently mounted diskettes. System allows automatic execution of any program on the currently defined static menu at a specific time, date, day of the week, or time lnterval. Logon/logoff, master and user profiles, and security by disk and file are provided. *(List Price: $89.95 plus $2 shipping and handling)*

Requires: Information available from manufacturer.

DB/DC Softwore Associotes
P.O. Box 4695
Manchester, NH 03108
(817) 882-8829

CIRCLE 667 ON READER SERVICE CARD

Word Wire

A word processor that includes all common text-editing features such as on-screen formatting, four direction cursor control, lnsertion and deletion of characters, words, and blocks of text, vertical scrolling with variable scroll speed, paragraph align and justify, and text search and replace. The *Word Wire* elso features print spooling which allows the user to edit one document and print another at the same time. Other features include file concatenation to build text from other sources, and the capability to underline or emphasize print where necessary. *(List Price: $89.95)*

Requires: 64K, one disk drive, a monochrome or color/graphics adapter, 80-column display, and printer.

Soft Spot Micro Systems
P.O. Box 415
North Canton, CT 06059
(203) 379-7047

CIRCLE 681 ON READER SERVICE CARD

New On The Market

General Accounting System

A modular general accounting system with modules including general ladger, accounts payable, accounts receivable, payroll, invoicing and inventory. The modules can be implemanted independently or combined in a coordinated system. The invoice-driven program includes menu selection, on-screen prompting, cursor control and error correcting. A configuration program supports any combination of single or double density disk, including hard disks. *(List Price: $450 per module)*
Requires: 128K, two disk drives or hard disk, MS-DOS.
Small Business Systems Group
6 Carlisle Rd.
Westford, MA 01886-5782
(617) 692-3600
CIRCLE 664 ON READER SERVICE CARD

MicroPERT O

A high-speed, interactive, menu-driven, graphics-oriented project scheduling package. Using *MicroPert O*, projects containing 220 events and 220 activities can be scheduled in 20 seconds or less. This package also features time-scaled graphics outputs, including Network diagrams and Gantt charts. Sorting by date or department for the Schedule Report and the Gantt Chart are among the other available options. *(List Price: $500)*
Requires: 128K, two disk drives, standard printer.
Sheppard Software Company
4750 Clough Creek Rd.
Redding, CA 98002
(916) 222-1553
CIRCLE 680 ON READER SERVICE CARD

AMSCHED

A comprehensive mortgege amortization progrem that prepares emortizetion tables from input. It provides monthly and yeerly breakdowns of principel end interest as well es peid-to-dete figures for P&I. Running totels are provided for each year es well. Output is printed on standard 6.5 by 11 inch continuous blank paper, and documentation is included. *(List Price: $30)*
Requires: 64K, one disk drive.
D² Enterprises
P.O. Box 871
Sholimor, FL 32579
(904) 651-3106
CIRCLE 676 ON READER SERVICE CARD

Sapana-Soft-Index-I

A menu-driven program designed to keep track of any type of published information, such as articles, books, megazines, journals, or newspapers. This program allows the user to display or print indexes for any given combination of publlcation, author, topic, subtopic, year, month, and day. Entries cen be viewed, changed, and deleted, and if the llst contains several deleted entries, it can be compacted. *(List Price: $49.95 with monuol)*
Requires: 64K, one disk drive, 80-column display, printer.
Sopano Micro Softwore
1305 South Rouse
Pittsburg, KS 66762
(316) 231-5023
CIRCLE 671 ON READER SERVICE CARD

Sapana-Household-Track-I

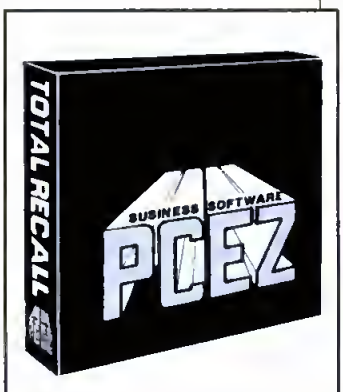
A menu-driven program designed for homeowners es a means of keeping track of household items. Smell businesses can also use this program to meintain inventory. *Household-Trock-I* will display or print items for eny given combination of date of purchese, category, subcategory, and room. At any time, the items can be printed or viewed in groups by selecting the grouping field which may include category, subcetegory, or room. For example, lf the term room is selected, ell the items in one room will be listed, followed by ell the items in the next room, and so on. *(List Price: $49.95 with manual)*
Requires: 84K, one disk drive, 80-column display, printer.
Sapana Micro Softwore
1305 South Rouse
Pittsburg, KS 66762
(316) 231-5023
CIRCLE 672 ON READER SERVICE CARD

Total Recall

An informetion storage and retrieval program designed for list handling applications.

The program provides file capecity limited only by the emount of disk storage, the ebility to creete and order subiists on fifteen parameters, end fest sorting up to three levels.

Users can generate form letters and configure mailing lebels including an lnformationai line and record number on each lebel. One to four labels can be printed using either the entire llst or a sublist. The program is compatible with both WordStor end Moilmerge. A thirty pege tutorial is provided for novice users. *(List Price: $129.95)*
Requires: 64K, two disk drives, DOS 1.1, e printer.
Edword S. Sucherman Promations Ltd.
1760 Maple St., #20
Northfield, IL 60093
(312) 446-3344
CIRCLE 646 ON READER SERVICE CARD



Totol Recoll, Edword S. Suchermon Promotions Ltd.

PC-108 Z-80 Co-Processor

A co-processor designed to provide quick and reliable execution of Z-80 programs designed to run in a CP/M environment on the PC. CP/M function calls are translated to the equivelent PC-DOS function calls making fully transparent operation possible. A programmer's guide is included in the documentation to allow users with speciel applications to develop programs with true dual-simultaneous processing capebilities. *(List Price: $495)*
Requires: information available from manufacturer.
Microlog, Inc.
222 Rt. 59
Suffern, NY 10901
(914) 357-8086
CIRCLE 670 ON READER SERVICE CARD

D2FORM

A screen forms generator that allows the user to create his own forms on the CRT screen. Each fiald, along with its langth and its mapped location on the screen, is stored automatically in a file. This information can be recalled by the program without the use of data statements. Printed copy contains the coordinates and size of each fiald. *(List Price: $45)*
Requires: 64K, one disk drive.
D² Enterprises
P.O. Box 671
Shalimor, FL 32579
(904) 651-3106
CIRCLE 677 ON READER SERVICE CARD

D2BACK and D2REST

A pair of programs that provide hard disk file backup and restoration, eliminating the need for tape drives. Built-in help screens and documentation/instructions are included. *(List Price: $35)*
Requires: 64K, one hard, end one floppy disk drive.
D² Enterprises
P.O. Box 671
Sholimor, FL 32579
(904) 651-3106
CIRCLE 678 ON READER SERVICE CARD

TEXTPLUS

The *TEXTPLUS* file management program, available in two formats, is especially designed for businesses using the PC. *TEXTPLUS* can be used for text processing and multiple formet label generation, and can also be used to produce expense reports, data book entries, card files, and mailing lists. Its text processor can merge text with the user's malling list or data base files. *(List Price: $200; compiled version lists for $240)*
Requires: BASIC version—64K; compiled version—126K. Both versions require one disk drive.
Owl Software
6927 Atoll Ave.
North Hollywood, CA 91605
(213) 982-6243
CIRCLE 674 ON READER SERVICE CARD

Reveal

A menu-driven program designed primarily for stockbrokers that provides total client and portfolio management. Reveal can be used to communicate with clients on their micro and transmit portfolio reports, letters, and memos. It can elso be used during phone conversations.

One of the system's features is the automatic pricing capability available through various pricing services. Users bave the option of receiving daily price informetion for all commodities, securities, options, and bonds from major exchanges.
(List Price: $1,550)
Requires: 126K, two disk drives.
Reveal Software, Inc.
6 Chelmsford Dr.
Muttontown, NY 11545
(516) 626-1166
CIRCLE 675 ON READER SERVICE CARD

Integrated General Accounting System

An integrated group of independent menu-driven programs for accounting tasks including General Ledger, Accounts Receivable, Accounts Payable, and Order Entry with billing, inventory control, and sales analysis. Programs were developed using Pascal MT+, and an integral B+ Tree file manager has been used to take advantage of high-capaclty storage devices for users requiring large data bases. The programs are compatible with any system running CP/M-60 or CP/M-66. *(List Price: $3,000 for the totol system, $950 for each independent program)*
Requires: Information available from manufacturer.
Smoll Business Systems, Inc.
1016 E. 31st St.
La Gronge Park, IL 60525
(312) 579-3311
CIRCLE 668 ON READER SERVICE CARD

Data Reporter

A new data base management software package featuring search and sort functions, file merge, e reformatter, global editing, menu-driven commands, and a label-making utility. The Dato Reporter also provides optional password protection, batch file processing of recurring tasks, a fully copyeble disk, and seven different types of search routinas. One search routine, called Soundex, gives the user access to data when ita exact spelling is unknown. Wben the approximate spelling of the data is typed in, the Dato Reporter will searcb and display anything with a similar spelling. *(List Price: $250)*
Requires: 64K, MS-DOS.
Synergistic Softwore
830 N. Riverside Dr., #201
Renton, WA 98055
(206) 226-3218
CIRCLE 682 ON READER SERVICE CARD

New On The Market

The C.B.S. System

A new financial and records management system for health care facilities designed to improve financial control and in-patient cost accuracy. The system prepares detailed reports such as bills, patient billing history, accounts receivable, payroll, petient census and summary, and general ledger with budgets. *(List Price: $18,985)*

Requires: 192K, one hard disk drive, MS-DOS, 132-column dot-matrix printer.

Convalescent Business Systems
2809 Honolulu Ave., #B
Montrose, CA 91020
(213) 957-8387
CIRCLE 529 ON READER SERVICE CARD

Edit

A full-function screen editor designed for genereting programs and other text files. Edit uses all the specially defined editing keys of the PC and features paging, scrolling, search, and cut-and-paste (utilizing reverse video). All of these features are supported by single strokes of the function keys. Other features include programmeble tabs and a help screen. Edit works with files of any size and creates files that are fuily compatible with all of IBM's compilers and the IBM assembler. *(List Price: $35 for disk and manual; $1 for monual only)*

Requires: 48K minimum, one disk drive, monochrome display.

McClain Software
P.O. Box 383
Turnersville, NJ 08012
CIRCLE 613 ON READER SERVICE CARD

Form Writer

A business program that was designed to work with the PC and the Diablo 630 printer.

The program is a combination data bese manegement/ mail merge/word processing package. The *Form Writer* sends e 9800 beud and can work on a parallel cable. The program can be used to send out a form letter to several hundred different names and addresses. Users can selectively batch those names from e master file of names.

The word processor uses the word processing capabilities built into the Diablo 630. The PCs function keys are used as on/off keys for underlining, right justification, bold printing and centering. *(List Price: $275)*

Requires: Diablo 630 printer.

Business Development International
P.O. Box 329
Third & Rollette
Pembino, ND 58271
(204) 837-8509
CIRCLE 611 ON READER SERVICE CARD

BDI Form Writer

Designed for use with the Diablo 630 printer, the *BDI Form Writer* reproduces standard forms, allowing the user to insert up to 14 types of information onto a selected form. This program can be used to create customer or prospect mailing lists, information mailers, invoices, purchase orders, and promotional letters. It also performs word processing and mail merge functions. *(List Price: Information available from the monufocturer.)*

Requires: Information available from manufacturer.

Business Development Internotionol
P.O. Box 329
Third ond Rollette
Pembino, ND 58271
CIRCLE 530 ON READER SERVICE CARD

NGS FORTH

A programming package that uses the DOS file system to enable programs and data to be read from or written to DOS files. It provides an environment save end reload, which can be used to load large vocabularies. An autoload screen boot allows the program to load any disk screen at system start-up.

NGS also provides three debugging aids: a decompiler that provides immediate decompilation of colon definitions, a locator that reports the screen number from which a FORTH word was loaded, and a tracer that allows real-time monitoring of an application's execution. *(List Price: $88, includes manuol)*

Requires: Information available from manufacturer.

Next Generation Systems
P.O. Box 2987
Santa Claro, CA 95055
CIRCLE 528 ON READER 5ERVICE CARD

The C.B.S. System, Convalescent Business Systems

LIBBY

A menu-driven, automatic library-managemeot program that catalogs files and programs on disks. The program scans each disk directory, generates a sorted master file, end retains the file. It uses the master file to identify the disk that contains the desired file or program, to list the complete directory of any disk on the video display, and to send a report of the master file to either the video display or the prioter in file name or disk order. *(List Price: $49.95)*
Requires: DOS, 48K RAM, ona disk drive, 80-column video display, 80-column printer (optionel).
Advanced PC Systems
608 Liso Woy
Campbell, CA 95008
(408) 243-1925
CIRCLE 527 ON READER SERVICE CARD

Microcourse

A software program that provides a computer-assisted instructional system in reading and language arts for elemeotary and junior high school studeots. Each student receives iodividualized practice and testing, and the teacher is informed which studeots need additional instruction in particular skills.

The Microcourse Reading program helps students master the basic reading skills most commooly taught in grades three through elght. The Language Arts program covers 488 skills in grammar, usage, and mechanics *(List Price: $39.75 per disk for 5 or less; $18 for back-up disk)*
Requires: 64K, keyboard, 5¼-inch floppy disk drives and interface, DOS, monochrome video display and adapter.
Houghton Mifflin Co.
1 Beacon St.
Boston, MA 02108
(817) 725-5213
CIRCLE 531 ON READER SERVICE CARD

CompuMedic/HD

A complete series of programs designed for doctors. Features include personal and transaction data management, accounts receivable, delinquent account haodling, full insurance processing, recall, practice analysis, and full report capability. It also allows for the transfer and restoration of inactive patient files to floppy disks; word processiog fully integrated with the patient data base; and informatioo oo referring doctors. *(List Price: Informotion ovoiloble from manufocturer)*
Requires: 128K, one disk drive, DOS, 132-column printer.
Dato Strategies, Inc.
332 South Juniper St., #210
Escondido, CA 92025
(819) 489-9218
CIRCLE 532 ON READER SERVICE CARD

DentalWare/HD

A complete series of programs designed for dentists. This system provides personal and transaction data management, accounts receivable, delinquent account handling, full insurance processing, recall, practice analysis, and full report capability. It also allows for transfer and restoratioo of inactive patient files to floppy disks; word processing fully integrated with the patient data base; and information oo referring doctors. *(List Price: Informotion ovoiloble from monufacturer)*
Requires: 128K, one hard disk, DOS, 132-column printer.
Dato Strategies, Inc.
332 South Juniper St., #210
Escondido, CA 92025
(819) 489-9218
CIRCLE 533 ON READER SERVICE CARD

TurboFile

A BASIC program for *VisiFile* users with 17 extra commands for file access and report writing. It can access up to ten VisiFile files simultaneously; Get, Replace, Add, Delete, or Undelete by full key, partial key, or record number. The user can write BASIC programs free form, using statement labels instead of line oumbers. *(List Price: $195)*
Requires: 128K, two disk drives, MS-DOS.
Creative Computer Applicotions, Inc.
P.O. Box 7074
Noshuo, NH 03062
(603) 888-6848
CIRCLE 534 ON READER SERVICE CARD

Telelcomm Kriegspiel

A program that enables a PC to act as the referee for Kriegspiel, a variant game of chess in which neither player knows hls opponent's moves except as they can be inferred from contact during play.

The referee program aosures that the moves obey the rules of chess and announces captures, checks, pawn tries, etc. It includes software to handle communications with any tarminal connectad to the host PC via a standard asynchronous interface, including a telephone connection. A selectable option allows both players to enter moves in turn at the host PC. Graphic displays show each player his positioo during the game, and the program can provide a post-game playback of the master board for insight into the strategies used. Runs under BASIC. *(List Price: $59.50 for diskette with program, operating instructions, ond rules of ploy)*
Requires: 64K, one disk drive, mooochrome display, asyncronous communications adapter, and modem (if telephone link is used).
Ladera Associotes
5134 Corning Ave.
Los Angeles, CA 90058
(213) 292-4924 or 204-0719
CIRCLE 614 ON READER SERVICE CARD

New On The Market

Info-SORT

A program that sorts data records in desired sequences. The sort function allows selection of records within a file, which can then be extracted and sorted. The program is written in Assembler language and can read and sort 1,000 records in less than ten seconds. *(List Price: $95)*
Requires: 64K, DOS, two disk drives.
LM Systems, Inc.
1340 E. Katello Ave.
Anaheim, CA
(714) 937-1641
CIRCLE 535 ON READER SERVICE CARD

Info-REPORTER

A report writer that uses multiple relational data files to quickly produce comprehensive reports and special forms. A printer spacing chart is shown on the display screen to allow users to position information and define its contents. The sequence definition function allows information to be accessed and reported in multiple sequences within the same report. A report definition function provides multiple headings, footings, detail lines, calculations and subtotals. *(List Price: $125)*
Requires: 64K, DOS, two disk drives.
LM Systems, Inc.
1340 E. Katello Ave.
Anaheim, CA
(714) 937-1641
CIRCLE 536 ON READER SERVICE CARD

Info-GEN

A record management system and applications generator that allows users to build a complete, customized, menu-driven application. The system can be used to define files, entry and update screen formats, calculations, and report or label formats. Definition of data files are provided, with automatic editing features for minimum and maximum field values and required entry information. Entry or update screen formats may be generated automatically or customized by using the flexible custom screen format function. *(List Price: $245)*
Requires: 64K, DOS, two disk drives.
LM Systems, Inc.
1340 E. Katello Ave.
Anoheim, CA
(714) 937-1641
CIRCLE 537 ON READER SERVICE CARD

Universal Report Facility

A program that allows the programmer to generate a universal report writer in BASIC language. The resulting program makes it possible for someone with clerical skills—no programming required—to generate customized reports on stock paper, labels, or the screen.

Fields can be placed on the report in any order across the page. The report can have variable column widths, and can be sorted on any field. It can be selective, excluding certain records based on upper and lower limits. All of these factors are determined by the operator using the generated program, not the programmer. *(List Price: $150)*
Requires: 128K, one disk drive, a parallel or serial printer.
Fogle Computing Corp.
P.O. Box 5166
357 E. Blockstock Rd.
Spartanburg, SC 29304
(803) 574-4950
CIRCLE 538 ON READER SERVICE CARD

Screen Design Facility

A programming utility used to develop screen display and data entry subroutines. The code generated adds full screen data entry to a user's programs. The program displays a protected "mask" and data is entered through alphanumeric "windows" in this mask. Insert, delete, erase to end of field, and other functions can be used within the windows; the forward and back tabs move from window to window. All of the generated code is in BASIC and can be changed if desired. *(List Price: $150)*
Requires: 64K, one disk drive.
Fogle Computing Corp.
P.O. Box 5166
357 E. Blockstock Rd.
Sportonburg, SC 29304
(803) 574-4950
CIRCLE 539 ON READER SERVICE CARD

CHRIS (complete human resource planning and information)

A menu-driven, on-line, interactive system designed to be used by human resource managers and planners. The program consists of several modules related to traditional human resource information systems (HRIS) areas, including General Administration, Compensation, Benefits, EEO, Attendance Control, Recruiting and Employment, and Training and Development. Other modules address the planning aspects of human resource management, such as Human Resource Planning, Career Planning, Organization Planning, and Forecasting and Modeling.

All modules have full-screen edited input and a variety of standard reports. An optional report writer allows the user to produce "ad hoc" reports without any knowledge of programming languages, and interfaces with an optional word processing module to generate mailing labels, form letters, and personalized letters. An optional statistical reporter produces two-way tables and other statistics from the CHRIS database. *(List Price: Information available from manufacturer)*
Requires: Information available from manufacturer.
GAI Systems
699 rue St. Francois
Florissant, MO 63031
(314) 831-6464
CIRCLE 542 ON READER SERVICE CARD

Bond Swap Analyzer

A program that analyzes the profitability of bond swaps under various market conditions and using various assumptions. Up to ten bonds on either side of the swap can be handled. The program computes the yield or price, duration, and accrued interest on each bond. The user can designate the income reinvestment rate and the horizon date yields. Net cash flows, profitability, and realized rates of return are displayed for each set of assumptions.

The program will also calculate break-even reinvestment rates, horizon yields, and spreads on each swap to determine the market conditions that would make each swap profitable. Reports can be presented in hard copy or on the screen. The package includes thorough documentation. *(List Price: $675)*

Requires: 126K, one 2-sided disk drive.

Technical Data
Financial Software Division
One Post Office Square
Boston, MA 12109

CIRCLE 540 ON READER SERVICE CARD

Yield Calculator

A program that calculates the yields on a wide variety of bonds, including government, corporate and municipal bonds; interest-at-maturity notes, discount and interest-bearing money markets; and dated bonds with odd first coupons.

Each calculation includes the yield to maturity, yield to call, and current yield, and a range table of up to 39 yield/price calculations can be displayed. True yields are automatically calculated for securities maturing on weekends or for dated bonds with short or long first coupons. *(List Price: $375)*

Requires: 128K, one 2-sided disk drive.

Technical Data
Financial Software Division
One Post Office Square
Boston, MA 02109

CIRCLE 541 ON READER SERVICE CARD

DISK MECHANIC

A software product designed to analyze, back up, preserve, repair and modify disks.

Using the program, the physical location of each file on a disk can be determined, and any byte of any sector or file may be examined or changed. Hidden files can be disclosed and deleted files restored.

Among other features, the program checks the RPM of any disk drive, modifies FDC parameters, and issues a report on anything it finds out of the ordinary.

The program is self-contained and comes with a detailed technical manual. *(List Price: $69.95 plus $3 shipping)*

Requires: 126K.

MLJ Microsystems
P.O. Box 825, Dept. PR
Framinghom, MA 01701
(617) 926-2055

CIRCLE 543 ON READER SERVICE CARD

PROMED

A comprehensive Billing, A/R & Collection system for the Medical Office. Designed to minimize clerical tasks, improve cash flow and maximize collections.

A scheduling system manages the preparation and submission of insurance claims and patient billings, and includes features to assist in follow-up and disposition of overdue accounts.

Other features include name-oriented patient records, direct real-time transaction posting, and deily to monthly audit trails. *(List Price: $4,000)*

Requires: 128K, hard disk, PC-DOS, printer.

Prose Software Systems
1503 Noro Dr., #F
Arlington, TX 76013
(817) 261-4439

CIRCLE 544 ON READER SERVICE CARD

FilePlan

An electronic filing system designed to facilitate data entry. Multiple records may be viewed simultaneously, and existing records provide examples for data entry.

The system's records can contain up to 2,048 characters in 32 variable-length fields of 99 characters each. Binary-tree indexing keeps records in proper sequence, automatically updating the sequence as records are added, deleted, or modified.

The system operates with the CP/M system and supports both the 8- and 16-bit versions. *(List Price: $295)*

Requires: 64K, two floppy disk drives with at least 150K of storage per drive.

Chang Labs
5300 Stevens Creek Blvd.
San Jose, CA 95129
(408) 246-8020

CIRCLE 546 ON READER SERVICE CARD

New On The Market

IQLISP

A new version of the *LISP* artificial intelligence language. Features include recursive functions, macro functions, PROGs, multiple display window support, multi-dimensional arrays, unlimited precision integers, and *8087* support. Over 150 primitive functions are defined in assembly language.

A library of functions defined in *LISP* provides structured-programming language extensions and support for editing, formatting and debugging. *(List Price: $125 includes manual)*

Requires: 128K, one disk drive.

Integral Quality
P.O. Box 31970
Seattle, WA 98103-0070
(206) 527-2918
CIRCLE 545 ON READER SERVICE CARD

ACCESSORIES

PC-COMPANION

A pocket-sized reference card that lists all 255 ASCII codes. It depicts the ASCII code and the corresponding control code or the special symbol available on the PC. *(List Price: $1 each; discounts for quantities available)*

D² Enterprises
P.O. Box 671
Sholimar, FL 32579
(904) 651-3108
CIRCLE 690 ON READER SERVICE CARD

Personal Computer Desk

An adjustable desk designed for home use. The Personal Computer Desk is constructed with a 1¾-inch tubular steel frame with extra-large, hook-on work surfaces that can be raised and lowered to position the keyboard and VDT for any operator regardless of chair height. *(List Price: $240, shipping not included)*

O/I Inc.
1314 S. Main
P.O. Box 1871
Elkhart, IN 46515
(219) 522-3496
CIRCLE 683 ON READER SERVICE CARD

Personal Computer Desk, *O/I Inc.*

The Lifeline, Instrumentation and Control Systems, Inc.

The Lifeline

An uninterruptible AC power supply designed to furnish voltage regulation and line filtering at all times. The Lifeline also includes an inverter that supplies power only during power outages with no interruption to the critical load.

A maintenance-free internal battery handles the full power of the system for five or ten minutes. Recharge to 95 percent of the full charge requires about 40 minutes.

A larger bank of batteries can be used to extend operation for several hours. The Lifeline plugs into a normal 120 VAC Wall outlet while the critical load is plugged into the dual convenience outlet on the UPS. *(List Price: $1,042)*

Instrumentation and Control Systems, Inc.
520 Interstate Rd.
Addison, IL 60101
(312) 543-6200
TWX 910-991-5945
FAX (312) 543-5250
CIRCLE 685 ON READER SERVICE CARD

IBM PC-Compatible Parallel Printer Cable

A cable that connects the PC with the Epson MX-80 or other printers using similar Centronics type interfeces.

The five-foot cable has gold-plated contacts to increase conductivity. Connectors are Winchester #49-1125P and Cinch/Amphenol 57-30360. Extra cable lengths are availeble. *(List Price: $35 postpoid; $45 postpoid overseas; oddltionol lengths $7.50 per five feet)*

Austin Computer Technologies
P.O. Box 26595
Austin, TX 78755
(512) 835-6136
CIRCLE 687 ON READER SERVICE CARD

PC Stand

A system unit stand designed to provide users with more storage spece.

The PC Stend provides room for users to store the keyboard out of the way under the system unit. The stand also allows the keyboard cable to be routed under the system unit elimineting the need for extension cables and raises the monitor for better viewing.

The atend meesures 22 inches wide, by 3 inches high, by 14 inches deep. *(List Price, $34.95 plus $2 for moil orders)*

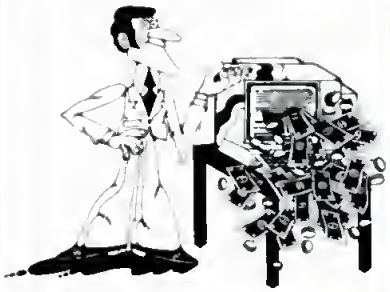
Personol Computer Accessories
4456 Portridge Ct.
Son Jose, CA 95121
(408) 578-7798
CIRCLE 686 ON READER SERVICE CARD

PC LOCK

An individually-coded chip for installetion in e PC to prevent access to the computer by unauthorized persons. Each time the system ia rebooted or the user activates the lock from the keyboard, the computer will not perform any function until a pessword is entered. Availeble with e fectory-essigned password or with a custom chip. *(List Price: $99 to $149)*

MPPi, Ltd.
1126 Adirondock
Northbrook, IL 60062
(312) 480-9730
CIRCLE 688 ON READER SERVICE CARD

PC Stond, Personol Computer Accessories



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(415) 821-2643

CIRCLE 238 ON READER SERVICE CARD

EDITED BY SUSAN HURLEY

Clubs, bulletin boards, and newsletters enable PC users to capitalize on their fellow users' knowledge.

Club News

ALASKA

The fledgling Anchorage Users Group would like to receive tips, hints, and edvice from other groups on how to organize.

According to mamber Mark Bolzarn the group is having difficultias getting establishad and attrecting newcomers. Current members would like to provide e newsletter end e bulletin board but need edvice on how to start these projects.

Letters should be sent to tha Anchoraga User Group, c/o Genaral Computar Sarvices, 213 W. Sixth Ava., #11, Anchorege, AK 99501. Attn: Mark Bolzern.

ARKANSAS

Tha Razorbeck PC Club of Little Rock would like to hear from fellow usar groups to sat up an information and softwere exchenge.

The club meets on the first end third Monday of the month at the First Faderal Building in Little Rock. Dues are $15 per yeer.

Accordlng to membar Wally Andarson membership is growing rapidly. The club was esteblished to help foster communicetions between PC users end others interested in the PC.

For more information ebout the club contect: Wally Anderson, 3000 Claburne St., North Little Rock, AR 72116, (501) 758-0148.

CALIFORNIA

Advantures Anonymous is a new club which provides members an opportunity to buy, sell, or trede user-constructed, non-commercial progrems through e bimonthly newsletter.

Membership is opan to enyone interested in the PC. A 1-yeer membarship is $59.95; mambers recaiva e gama and en adventure disk upon joining. Subsaquant dues are $34 per year.

Members can edvertise their "adventures" or progrems in the club's newsletter for 25 cents per word up to e maximum of 120 words per issue.

Tha club library currently contains several usar-davelopad adventures and games which are available to members. For further information contact Input Investments, P.O. Box 8286, Rancho Santa Fa, CA 92067.

The IBM PC Club of San Francisco will include a "bulletin board" in avary newsletter. The "boerd" will carry notices of computerware mambars want to buy or sall.

Club member Max Brioski wants to expand tha bullatin board to include personal ennouncements end peid edvertisements. Brioski ancourages othar PCers to contect him in care of the club at 1880 California St., #12, San Frencisco, CA 94109 (415) 775-8882 with "suggestions, ideas, proposals (and) interests."

Word comes from Dieblo Velley thet e naw group, tha Diablo Valley PC (DVPC) has been formad to serva the needs of PC owners in the Welnut Creek, Plaasant Hill

and Concord areas.

The group will hold monthly meetings and currently provides members with a newsletter, special interest groups, a library and a resource list. Nawcomers are invited to attend meetings. Contact Alfred Hunt, c/o Diablo Valley PC, P.O. Box 23784, Pleasant Hill, CA 94523 (415) 687-8037.

COLORADO

The Colorado Springs area is homa to a new user group. The group is still in the formative stage but plans are underway to elect officers, publish a newsletter and set up a software exchange.

Further information about the new group is available from Claveland L. Bell, 17665 Shahara Rd., Monument, CO 80132 (303) 488-3049.

HAWAII

The address for tha Hawaii user group has been changed. The new address is:

Hawaii IBM PC Users Group, P.O. Box 22967 Honolulu, HI 96822.

Meetings are held the second Tuesday of the month. Contact Doug Long in care of the club.

MARYLAND

A logo contest is baing sponsored by the Baltimore IBM Personal Computar Users Group. The logo will be used on the group's newsletter, *I/O News*. The winner will receive a free 1-year membership. Sketches should be sent to Bob Ebarsol, 2603 Bradenbaugh Rd., Whitehall, MD 21161.

Advertisements are now being accepted for *I/O News*. Rates are $20 for a full page, $10 for a half page, and $5 for a quarter page. *I/O* provides usar tips, meeting updates, and notes on member-owned computerware for sale or purchase.

OHIO

Another new group, the Western Reserve IBM Personal Computer Association (WRIPCA) was recently formed in Warren, Ohio.

The purpose of the group is to answer quastions, concarns, and needs of PC users in the area.

The group meets at 7p.m. on the second Tuesday of the month at the Computer-Land in Warren. Meeting agendas include a guest speakar every month and a discussion of member concerns and problems.

A public domain library of software, product reviews and articles is available to

PC will publish o periodic listing of PC user groups ond their octivities. Drop o line to Club News, PC, One Pork Ave., New York, NY 10016.

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The **SDC ANTIGLARE SCREEN** eliminates the eyestrain caused by reflections and improves the contrast of the display **without reducing brightness.**

The ANTIGLARE SCREEN mounts neatly in the recessed area of the PC Display with adhesive foam tape (inc.).

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(In Texas)
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SDC SCREEN DATA CORPORATION
Sutton Park
240 Cedar Knolls Road
Cedar Knolls, New Jersey 07927

CIRCLE 447 ON READER SERVICE CARD

"A MAJOR STEP FORWARD INTO THE EXPLORATION OF THE WAYS WE ARE ALL GOING TO LIVE WITH MICRO CHIPS."

—Daniel Dennett, Co-author of *The Mind's I*

Musician and sociologist David Sudnow has written the first book to define the essence of video skill—not how to master, but what mastery is. "In this worthy sequel to [*Ways of the Hand,*] his tract on mastery of music-craft, Sudnow once again explores a lot of worlds at once—the real one, the one in the machine, and all the myriad ones inside the self. It may not show us how to coax the children home, but this book gives us good ideas of where they go" (Marvin Minsky, Department of Artificial Intelligence, MIT).

EYE, MIND, AND THE ESSENCE OF VIDEO SKILL

"An intriguing account of the breakthroughs and breakdowns of the adult mind as it plunges into the advancing microworld. Sudnow shows us an exciting way to relate to approaching computer technology."

—Tim Gallwey, Author of *The Inner Game of Tennis*

"Sudnow has made a breakthrough in assessing the two-dimensional 'world' of the computer and the sort of body and mind it creates in us."

—Hubert Dreyfus, Author of *What Computers Can't Do*

WARNER BOOKS

Now at Bookstores

To order, send $16 50 (includes postage and handling) to Dept PAA(C)0-446-51261-3, Warner Books, 666 Fifth Avenue, New York, NY 10103 Check or money order only. Allow four to six weeks for delivery

Club News

members. Dues go to support the library and the club's newsletter. Anyone wishing to join or exchange software should contact the WRIPCA, c/o Larry Cavin, ComputerLand, 2000 North Rd. SE, Warren, OH 44484.

INTERNATIONAL

The PC Association of Canade recently became affiliated with the international Personna Computer Association, Inc. of New Jersey. The two groups want to foster a better exchange of information between Canadian and American PC users.

An international PC trade show is being organized under joint sponsorship. The show is slated for September 9-10 at the Skyline Hotel in Toronto.

PCA is currently affilieted with a German PC user group and is looking to set up contact with e users group in Norway. Both PCA and Personna members hope affiliation with other groups will occur as PC use grows worldwide.

For further information about PCA, membership, or the trade show, contact PCA, P.O. Box 251, Ajax, Ontario L1A 3C3, Canada.

PC User Groups

This list provides the names and addresses of PC User Groups worldwide. You can check this list to locate other PC aficionados in your area.

ALABAMA

Birmingham User Group
Chet Eliis
ComputerLand
215 W. Valley Ave.
Birmingham, AL 35209
(205) 942-8085

ALASKA

Anchorage User Group
Mark Bolzern
c/o General Computer Services
213 W. 6th Ave. #11
Anchorage, AK 99501

ARIZONA

The Phoenix IBM PC Users Group
Fred Linch
P.O. Box 44218
Phoenix, AZ 80564
(602) 954-7519

IBM PC Idea Exchange
Lisa May
United Systems Corporation
1074 E. Sandpiper Dr.
Tempe, AZ 84283
(602) 631-9363

IBM PC User Group
Theresa Baudier
P.O. Box 1489
Tucson, AZ 85701
(602) 822-4751

CALIFORNIA

San Diego IBM User Group
Michele Albright
4005 Isle Dr.
Carlsbad, CA 92008
(714) 434-1608

San Diego Computer Society
John Field
1384 Caliente Loop
Chula Vista, CA 92010
(714) 421-9686

IBM PC User Croup
Lee Wersel
7255 Orchard Dr.
Gilroy, CA 95020

Beach Cities IBM PC Users Croup
Phil Root
6242 Moonfieid Dr.
Huntington Beech, CA 92648
(714) 847-6369

Modesto-Turlock PC User Group
Liz Leedom
Box 1122
Modesto, CA 95353
(209) 523-4218, 578-2358

IBM Users Group of Californie
Neil Zachary
P.O. Box 4136
Los Angales, CA 90028
(213) 937-1314

Business Computer
Usars Croup
Devid Nussbaum
40 Software Central, 650 East
Colorado Blvd.
Pasadene, CA 91101

Dieblo Velley PC
Alfred Hunt
P.O. Box 23764
Pleesant Hill, CA 94523
(415) 687-8037

Adventures Anonymous
Michael Eddy
P.O. Box 8286
Rencho Sante Fe, CA 92067

Cubic Computer Club
Pata Nalson
P.O. Box 80787
San Diego, CA 92138
(714) 453-4953

San Frencisco IBM PC User Croup
Alfred Goodwin
Software Center
4720 Geary St.
San Francisco, CA 94118
(415) 751-2231

U.C. San Francisco User Croup
Bruce Stegner
UCSF U-76
San Frencisco, CA 94143
(415) 666-1409

PC Club
Max Brioski
1880 California St. #12
San Francisco, CA 94109
(415) 775-ß882

Bay Area User Croup
Christian Du Lac
P.O. Box 155
San Francisco, CA 94101
(415) 668-4647

Santa Barbare City College Computer
Scianca Dapartment
Stu Swartz
721 Cliff Dr.
Senta Barbara, CA 93109
(805) 966-2919

Silicon Vellay Computer Club
Petar Herris
510 Lawrence Expressway
P.O. Box 686
Sunnyvale, CA 94086
(408) 248-9057

San Fernando Valley Club
Al Saavedre
4785 Morro Dr.
Woodlend Hills, CA 91364
(213) 347-9495

ReadiWriter®

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ReadiWriter is for words thet matter: thst ere changed and changed again; that must look *just* right when you are done.

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ReadiWriter eutomatically: builds **tables of contents;** does numbering of chepters, lists, page headings and footings; and it numbers and places **footnotes.** Indexing commands aid building multi-level indexes.

ReadiWriter supports **proportional** spacing, **superscripts** and **subacripts.** It **centers, right aligns, underscores** and **boldfsces** taxt.

ReadiWriter accepts input from one or more files or diskettes; there is **no size limit** for a document.

All settings are under your control: left end right mergins, heading end footing margins, paragreph indent, etc. Variables and mecros eliow substitution end teiloring to special needs.

You can print documants continuously or e **page st a time** and you cen print selected parts of a document.

ReadiWriter **supports most printers.** New printer support is easily added by usars through spacial device filas.

ReadiWriter formats with imbeddad commands and thus requires a seperate editor; it is the perfect companion for the IBM Personel Editor.

ReadiWriter comes with two manuals: a tutorial, and a 100+ paga reference manuel; they are evaileble together for $30 with full credit given if ReadiWriter is ordered within 60 deys. Thera is a separetely priced Advanced Users Menual.

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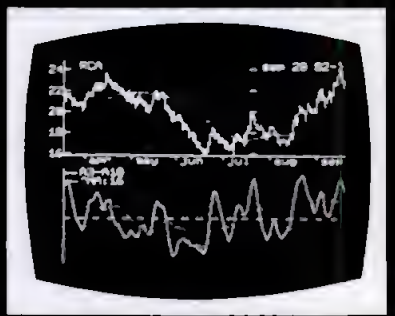

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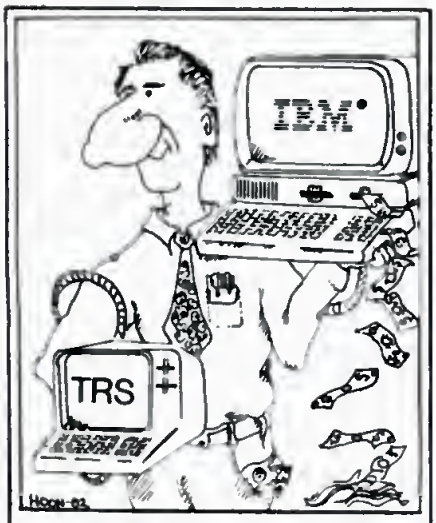

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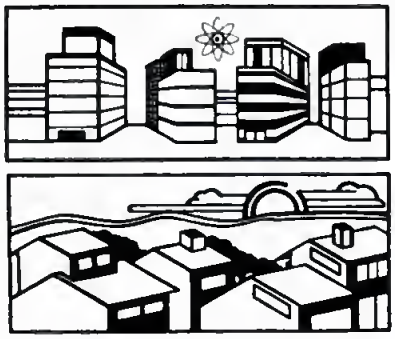

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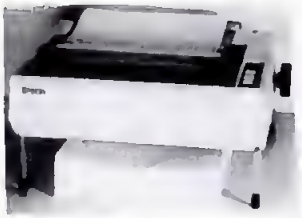

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CIRCLE 268 ON READER SERVICE CARD

EDITED BY COREY SANDLER

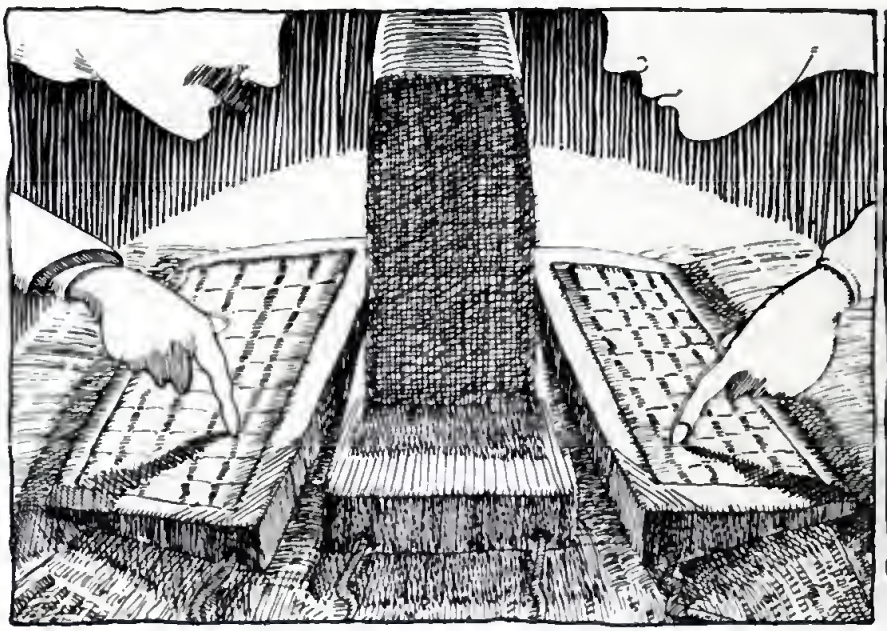
PC readers pass on their programming tips and tribulations.

User-To-User

Did you ever hear the ane about the fish heater thot went owoy? Mel Petersan cantributes the salutian ta an oquatic mystery which is very oppropriote to o tapic in this issue: electrical interference. I recognized his ploint immediotely, since it wos a problem I hod to deal with in setting up my own hame office. My writing room is upstoirs in our house, ond heating bills con rise very quickly in wintry upstote New Yark. To make o long story short, my PC took electricol umbroge at a smoll spoce heoter plugged into the same line in the office. I already had a surge protectar ond line filter installed, but the monitor screen still shronk, the disk drives still groaned, ond the fon still hiccupped eoch time the heoter came an. I decided I couldn't type very well in mittens—the salution was to install o dedicated electric line for the heater.

Moving from fish to glue, several readers wrote to suggest woys to odd home row bumps to the IBM keyboard. If you use Fredric Wilsan's woy, just be very coreful nat to get the stuff between the keys or into the electronics of the boord. Perhops, even as we sit here now, some manufacturer is hard at wark on producing replacement key cap cavers.

Other suggestions this month are no less exceptianal: haw ta pick up a bit af speed in FOR . . . NEXT loops, how to change calars in high resalution mades, and how to moke your BASIC statements come to front and center.



Out of Colors?

The IBM PC high-resolution mode ectually supports only one color: white. By sending a value to hexadecimel eddress 3D9, it is possible to select one of eight colors for e direct-drive color monitor end 16 colors for sets with intensity modification. By converting the hexadecimal velue to decimel end using BASIC's OUT statement to send e velue to the corresponding output port, one can select any color in the high-resoiution mode.

To chenge the color of text and grephics while in the high-resolution mode, Include the following stetement in your BASIC progrem:

```
OUT 985,X
```

where X equals color desired from 1 to 15.

IT IS POSSIBLE to select one of eight colors for a direct-drive color monitor.

This change will remain in effect until a WIDTH or SCREEN stetement is executed. Remember thet you must be in Screen 2 mode when executing this statement.

Steven Lombardo
Huntington Bey, New York

Bumping Your Keyboard

In the "Wish List" of Volume 1, Number 8, a reeder esked for "home row" bumps to help touch typists. Here's e little hint.

Plece a drop of Elmer's glue on the top of the F, J, Return, end Shift keys, end the number 5 on the keyped. When the glue dries, it produces e smell transparent bump that is eesily felt with the fingertips. The glue does no damage to the keys and can be removed with e fingerneil.

An elternetive would be to place a drop of glue on eech of the "ceution" keys, those that so often cause problems when struck eccidentelly—CapsLock, PrtSc, the Beckslash, and NumLock.

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Neptune, New Jersey

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half hour or so, one or more characters mysteriously eppeared on the screen.

THE CONCLUSION I came to was that my problem was unique to the environment in which I was using the PC.

This quickly became very frustreting, since the keystrokes were often function keys including Tron, Cont, and others.

The service department at the plece I bought my computer was very helpful but, unfortunately, unable to solve the problem. They tried replecing the keyboard (an obvious first ettempt), then replaced the system board, and finally replaced the remaining components in the system unit (power supply, disk drive, disk adepter and mono/printer adepter).

Having made six trips back to the store for service, I decided to call IBM's service department. I described my problem, and they called back leter with the edvice that I should mail my keyboard to IBM in Illinois!

Since my entire system hed been replaced, piece by piece, the conclusion I came to was thet my problem was unique to the environment in which I wes using the PC.

My first thought was of static electricity. This didn't seem a likely cause, however, since there are no rugs or carpets in the room and e humidifier keeps the relative humidity et e reasonable level. The next consideretlon was the power source. There were no obvious surge problems with the refrigerstor or other eppliances. I had noticed some interference in e TV picture et times, though, so I decided to see if I could isolete thet problem.

The problem turned out to be caused by a heater in a tropical fish tank. As the heater's switch fluttered between on and off stetes, it interfered with everything on the line. With the heater unplugged, my PC experienced no problems.

Is the PC overly sensitive to this type of interference? If so, will IBM correct the problem, or will we PC owners have to buy external line fiiters?

I HAD noticed some interference in a TV picture at times.

Mel Peterson
Minneapolis, Minnesota

Coming Up to Speed

A BASIC program which contains long FOR–NEXT loops can gein e significant increase in speed if you omit the variable

Figure 1: A program to demanstrate the difference in running time when variable names are omitted from the NEXT statements in lines 180 and 190.

```
100 CLS
110 REM Time test for loops
120 PRINT "STARTING"
130 A=0:B=0:C=0:0=0:E=0:F=0:G=0:H=0:I=0:J=0:K=0
140 L=0:M=0:N=0:0=0:P=0:Q=0:R=0:S=0:T=0:U=0:V=0:W=0:X=0:Y=0:Z=0
150 ST$=TIME$
160 FOR Y%=1 TO 20
170 FOR Z%=1 TO 1000
180 NEXT Z%
190 NEXT Y%
200 SP$=TIME$
210 ST!=VAL(ST$)*3600+VAL(MIO$(ST$,4,2))*60+VAL(MIO$(ST$,7,2))
220 ST!=VAL(SP$)*3600+VAL(MIO$(SP$,4,2))*60+VAL(MIO$(SP$,7,2))
230 PRINT "START TIME =";ST$,"STOP TIME = ";SP$
240 PRINT "TOTAL LOOP TIME =";SP!-ST!
250 ENO
```

name on the NEXT statement (see IBM's BASIC manual, page 4-89).

Try the accompanying program (see Figure 1). I timed a run at about 28 seconds.

A BASIC program can gain speed if you omit the variable name on the NEXT statement.

Now remove the variable names in lines 180 and 190 so that they read only NEXT. Running the program should now take about 11 seconds—a real difference.

A tiny additional amount of time could be saved by putting the NEXTs on the same line. Another point to notice here is that the immediate variable type definition such as A% is just as efficient as the DEFINT A statement.

Terry Lundgren
Phoenix, Arizona

Front and Center

When writing programs in BASIC that require frequent centering of words, I employ a user-defined function that does the work painlessly. First I define the function:

```
DEF FNCEN$(V$,X) = SPACE$((X-
LEN(V$))/2)+V$
```

Then whenever I want to center something on an 80-column display, I use the statement:

```
PRINT FNCEN$("Center This",80)
```

Simply put the words you want centered in quotes (in place of "Center This"), and change the second argument, 80, to 40 if you are using a 40-character screen.

Norris Boyd
Kingsport, Tennessee

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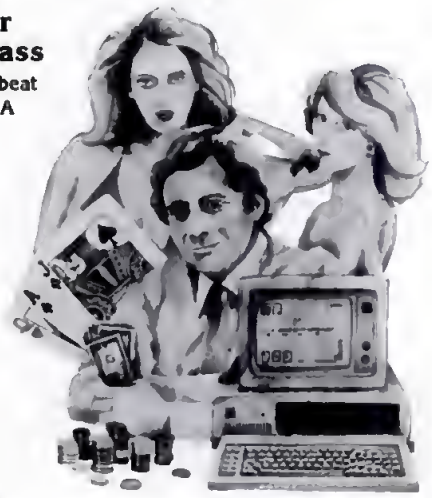

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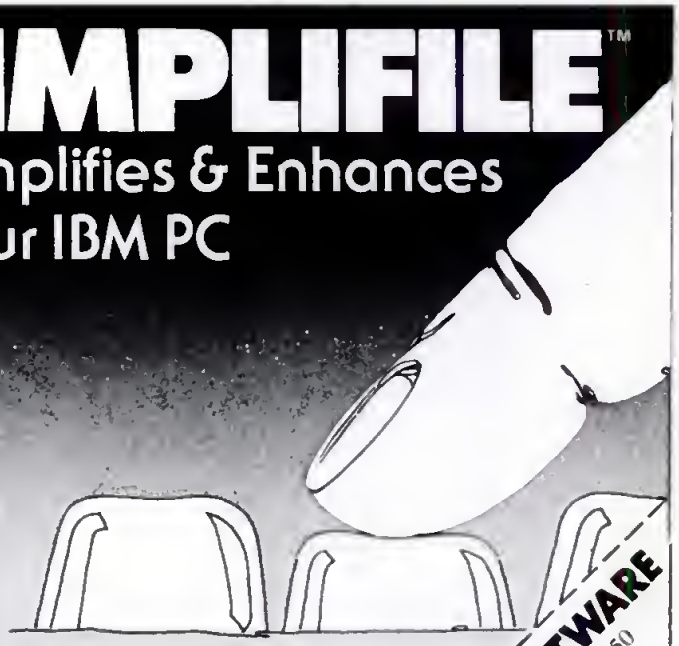

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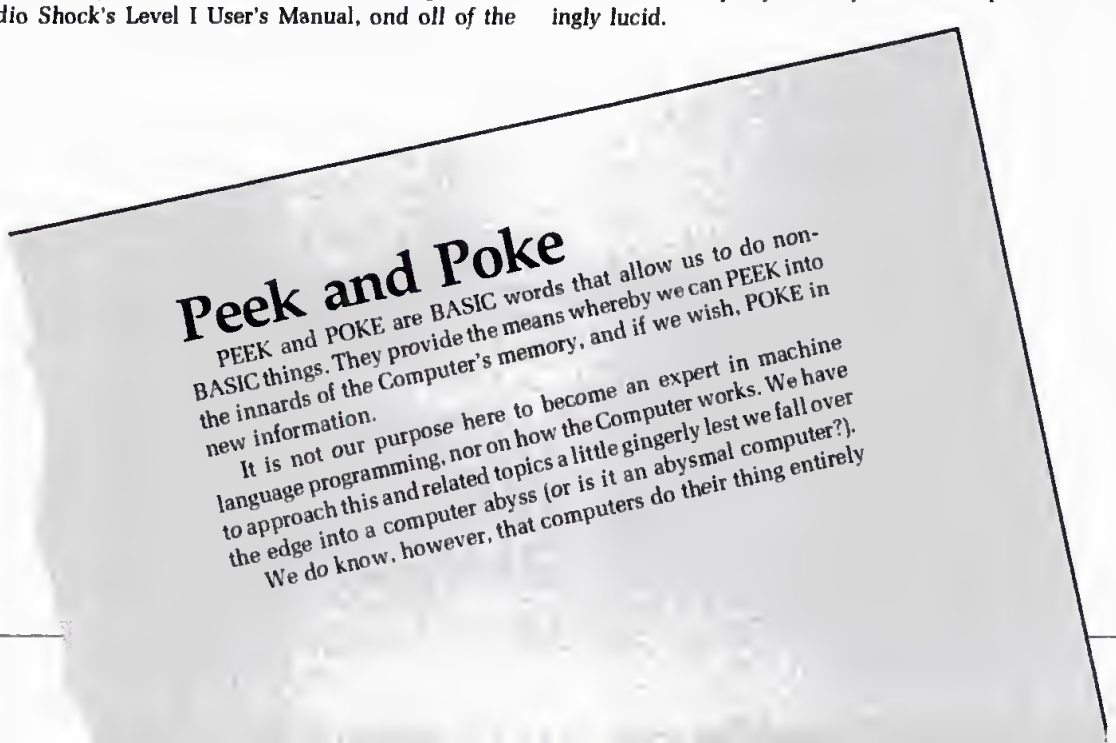
Back To BASIC

Learning IBM BASIC For The Personal Computer
David A. Lien (CompuSoft Publishing Co., El Cajon, California, 1982) 425 pages, $19.95; ISBN #0-932760-13-9

David A. Lien has already entered the homes of hundreds of thousands of microcomputer owners through his demystifying handbooks, including The BASIC Handbook, Learning TRS-80 BASIC, Radio Shack's Level I User's Manual, and all of the Epson MX printer manuals.

His new book, excerpted here, translates into English the most common entry-level programming language for PC owners—IBM BASIC. We have selected three chapters (45, 46, 51) that deal with some of the more vexing elements of the language: Peeks, Pokes, and Debugging. Even if you are already familiar with these concepts, you will find Lien's explanations refreshingly lucid.



Peek and Poke

PEEK and POKE are BASIC words that allow us to do non-BASIC things. They provide the means whereby we can PEEK into the innards of the Computer's memory, and if we wish, POKE in new information.

It is not our purpose here to become an expert in machine language programming, nor on how the Computer works. We have to approach this and related topics a little gingerly lest we fall over the edge into a computer abyss (or is it an abysmal computer?).

We do know, however, that computers do their thing entirely

by tha manipulation of numbers. Tharafore, when wa PEEK at tha contents of mamory, guass what we'll find? Numbers? Vary Good!

MEMORY MAP

Decimal Address	Hex Address	Function
0 65535	00000 0FFFF	UP TO 64K READ/WRITE MEMORY ON SYSTEM BOARD
65536 262143	10000 3FFFF	UP TO 192K MEMORY IN I/O CHANNEL
282144 655359	40000 9FFFF	384K FUTURE MEMORY IN I/O CHANNEL
655360 671743	A0000 A3FFF	RESERVED
871744 720896	A4000 B0000	GRAPHICS/DISPLAY MONOCHROME DISPLAY BUFFER
753664 786431	B8000 BFFFF	COLOR/GRAPHICS
786432 983039	C0000 EFFFF	192K MEMORY EXPANSION
983040 999423	F0000 F3FFF	RESERVED
999424 1048575	F4000 FFFFF	48K SYSTEM ROM

The Memory Map in Figure 1 shows that large chunks of the Computer's memory are resarved or "mapped" for very specific usas. Tha BASIC ROM for axampla, uses byte addresses 999424 through 1032192 (commonly refarrad to as 1 MEGabyte). All numbers we talk about here ara decimals, not hex, octal, binary or Sanskrit.

The ranga of tha numbers we can PEEK or POKE is 0 to 65535 (64K). But that's just our Read/Write user mamory. We obviously hava many more addresses than 0-65535. Our 16 bit IBM computar allows us to use up to 256K of memory (if we hava it installed), beyond the ranga of our usual PEEK and POKE. In ordar to access thase additional memory addressas, wa use the DEF SEG statement. This statement DEFinas tha SEGment of mamory that we will PEEK or POKE at a givan time.

But it isn't as easy as it sounds. Wa must giva the DEF SEG

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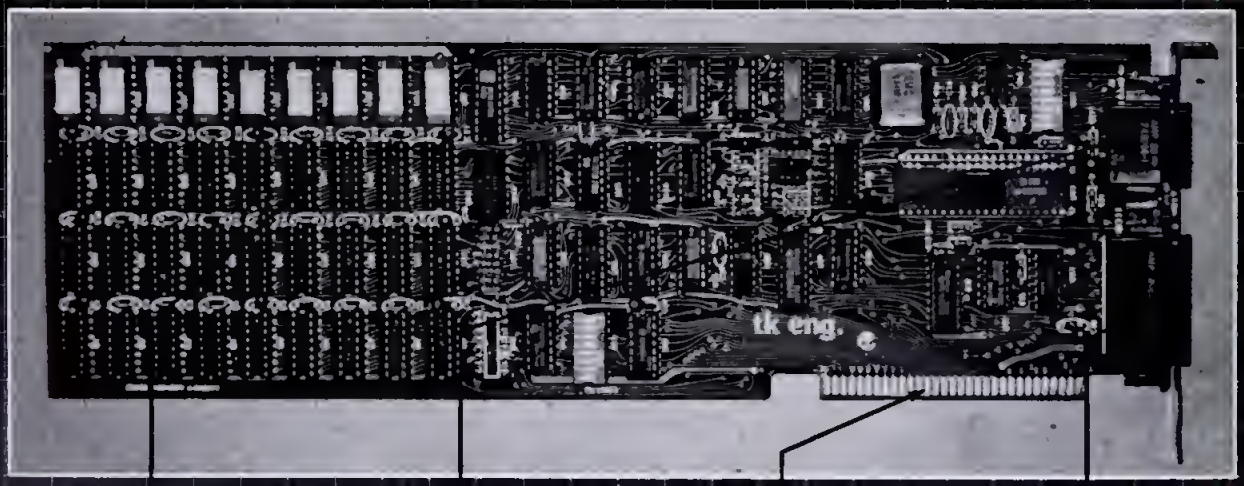

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statement the address of the segment we want, divided by 16. When the DEF SEG statement gets an address, it automatically multiplies it by 16.

Turn the machine off to clear out memory, turn it back on, bring up BASICA and type in this NEW program:

```
5 DEF SEG = 62464!
2Ø N = 82ØØ
4Ø PRINT N, PEEK(N), CHR$(PEEK(N))
5Ø N = N + 1
7Ø GOTO 4Ø
```

Let's analyze the program before RUNning it.

Line 5 sets the SEGment of memory to the beginning of ROM. The actual highest absolute address is 62464 * 16 = 999424 (F4000 Hex).

Line 2Ø sets the beginning address where we want to start PEEKing. As Figure 1 shows, there are lots of good places to go spelunking, and we can change line 2Ø to start wherever we want.

Line 4Ø PRINTs three things:

A. The address—that is, the number of the byte, the contents of which we are PEEKing at (the offset into the SEGment).

B. The contents of that byte, expressed as a decimal number between 0 and 255.

C. The contents of that address converted to its ASCII character. (Many of the ASCII characters are not PRINTable. Go back to the Chapter on ASCII if your memory has grown dim.)

OK, now:

. . . RUN

the program, being ready to freeze it with Ctrl-Num Lock if you see something interesting. It can also be STOPped at any time with Ctrl-Break, and restarted with CONT Enter without having to start all over again with N at 8200.

Didn't see anything interesting? What did you find starting at address 9141? You have to be able to read vertically as the letters swish by.

Also, at address 8520 we see what almost looks like BASIC commands.

Change N to start at different places in memory and PEEK to your heart's delight. You can't goof up anything by just PEEKing. It's indiscriminant POKEing that gets us into trouble.

The command level is very handy for resetting the starting address. We can change the value of N by just typing: Ctrl-Break

```
N = 15ØØØ Enter
```

for example, then:

```
CONT Enter
(OR F5)
```

instead of RUN. When done PEEKing, and having seen far more information than can possibly be absorbed, rework Line 4Ø to read simply:

```
4Ø PRINT CHR$(PEEK(N));
```

. . . and RUN.

It PRINTs only the ASCII characters, horizontally, and is the ideal program to RUN when friends visit. Just act casual about the whole display and avoid any direct questions. Makes a great background piece for a science fiction movie.

When you find an interasting spot, hit Break, then

```
PRINT N Enter
```

at the command level to find out where in memory we ere PEEKing. (Don't you wish we could explore the corners of our minds as eesily?) CONTinue on when ready. Heving degenerated from PEEKing to leering, it's time to see whet else we cen do.

Careless POKEing Can Leave Holes . . .

Before POKEing, we'd better see that we're not POKEing a stick into e hornets' nest. It's with the greetest of ease that we destroy a progrem in memory by POKEing around where we shouldn't.

Obviously there is no use POKEing the ROM area since ROM stands for Read Only Memory. It's not changeable. The rest of the "Memory mepped" area, from 65536 thru 999424 is reserved for specific things, so best not to POKE in there while we're just bungling eround. Anything above 4000 should be available memory, unless taken up with our BASIC program or required for processing. With such a short program as ours we surely can't goof enything up? Can we? Let's PEEK eround 10000 and see if anything is going on there. Change these program Lines to:

```
5 DEF SEG
2Ø N = 1ØØØØ
4Ø PRINT N; PEEK (N),
```

. . . and RUN.

This default value of DEF SEG means set the segment to the beginning of where BASIC stores its programs. This may be as high es 25000 in Disk BASICs.

Whet we see ere the address numbers and their contents, in eesy-to-read parallel rows. Unless you've been messing around with other programs since power-up, you should just see nice rows of 0's. Tha mamory at these locations is in "neutral", waiting to be used.

Great! Let's change our program end POKE in some information, then do something with it. Make it read:

```
1 REM * POKE PROGRAM *
5 DEF SEG
2Ø N = 1ØØØØ
3Ø READ D
4Ø POKE N,D
5Ø N = N + 1
6Ø IF N = 1ØØ11 THEN END
7Ø GOTO 3Ø
1ØØ DATA 8Ø,69,69,75,45,65,45,66,79,79,33
```

Before RUNning, let's anelyze it. Line 5 sets the SEGment to tha beginning of progrem storage. Line 2Ø initializes the starting eddress et 10000 Line 3Ø READs a numbar from the DATA Line Lina 4Ø POKEs the DATA "D" into address "N" Line 5Ø increments the address number by one Line 6Ø ENDs axecution after we've POKEd in all the DATA Lina 7Ø sends us back for more DATA Line 1ØØ holds the DATA we are going to POKE into memory.

Now - RUN

Well, that was sure fast. I wonder what it did? How can we find out? Should we PEEK at it? Yes, but let's leave the old program in and just start a new one at 2ØØ.

```
2ØØ REM * PEEK PROGRAM *
21Ø FOR N = 1ØØØØ TO 1ØØ1Ø
22Ø PRINT N, PEEK (N)
23Ø NEXT N
```

... end RUN 2ØØ

```
1ØØØØ   8Ø
1ØØØ1   69
1ØØØ2   69
1ØØØ3   75
1ØØØ4   45
1ØØØ5   65
1ØØØ6   45
1ØØØ7   66
1ØØØ8   79
1ØØØ9   79
1ØØ1Ø   33
```

How about that? We really did change the contents of those memory locations. We shot the numbers from our DATA Line right into memory. Now if we only knew what those numbers stood for. Wonder ... if we changed them to ASCII characters, would they tell us anything?

Add:

```
2Ø5 CLS
22Ø  LOCATE  13,15  +  N-1ØØØØ  :  PRINT  CHR$
   (PEEK(N));
```

to PRINT at a certain location on the screen

... and RUN 2ØØ

PRINT THE RESULTS HERE

And that's how PEEK end POKE work.

Special POKE Addresses

Function Keys

Let's take one more look et our 10 special function keys. We'll leave Keys 2-5, 7 and 8 alone since they seem to be pretty useful, but why don't we change the others? After all, this is a personal computer. Enter this NEW program:

```
1Ø KEY 1, "LIST" + CHR$(13)
2Ø KEY 6, "EDIT"
3Ø KEY 9, "AUTO" + CHR$(13)
4Ø KEY 1Ø, "CLS" + CHR$(13)
5Ø DEF SEG : POKE 1Ø6,Ø
```

... end RUN.

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SAVE this program as "KEYS". Notice the bottom row on the display, with our new creations. We perform the POKE in line 5Ø to avoid complications on the INPUT buffer. This is a good idea whenever we program any of the "soft" keys, or after INKEY$ has received the last character from a Soft Key string.

Perhaps the most used of these keys will be F10. When we get in the habit, it's so convenient to just hit a single key to CLear the screen. When we use F10 there can't be anything on the screen on that line, or we'll get a Syntax error. Best in that case to use Ctrl-Home instead.

Suppose we like this new "soft key" arrangement so much that we want the computer to automatically power-up with it, instead of what comes with the computer. Disk users have a beautiful feature called AUTOEXEC.BAT that bypasses typing in the DATE and TIME and AUTOmatically EXECutes a command, such as LOAD BASIC. So, let's add one more line before we go back to DOS:

```
6Ø KEY ON : NEW
```

Be sure to SAVE the program as "KEYS" before you RUN it. We put in the NEW command so the program will erase itself after the Keys are reprogrammed.

We include here the process without explanation for the thrill seekers among us who can't leave well enough alone.

First return to DOS (SYSTEM) and make the prompt read:

```
A>-
```

Now (temporarily) take the write-protect tab off the COPY of your System Master disk you've been using, and type:

```
COPY CON: AUTOEXEC.BAT
DATE
B:
A:BASICA KEYS
  <F6>
```

And the Display reads:

```
1 file(s) copied
```

The first instruction copies from the CONsole (keyboard) into the file AUTOEXEC.BAT. After we type in the DATE, the rest of the routine takes care of the startup process we have to go through. We could also make the last Line simply:

```
A:BASICA
```

That way we wouldn't have to RUN a program, just load BASICA.

From now on, the computer will AUTOmatically power-up with the soft keys programmed as before, as long as we use the same System Master disk. Other disks could be prepared for other automatic soft key programming, or a variety of BASIC programs held on 1 disk and called up for different purposes as needed.

Video Display Buffers

Beginning at absolute address BØØØØ hex (720896 decimal (704K)) is a 4K memory buffer on the monochrome display card. Since there are 2000 print positions on the screen, we need 2 memory locations for each screen position.

The first location holds the actual ASCII code for the character (an even numbered address). The second is the "attribute" for the corresponding character (odd address). The attribute tells us what mode the character was printed in, such as high intensity, underlined, blinking, etc.

We already know about ASCII codes. Tha code for the attribute is a little harder to understand. Each byte of address is mada up of 8 bits. We'll label the bits as follows:

128 - □
064 - □
032 - □
016 - □
008 - □
004 - □
002 - □
001 - □

Why not label the bits 1,2,3.4,. . .8? Well, the numbers shown are tha actual ASCII numbers that activate the respectiva bits. CHR$(128) activates or "sets" the top one, and CHR$(1) sets the bottom one. CHR$(7) sets the bottom threa (4 + 2 + 1).

It all goes back to binary math. (Oh, great!) If we send a decimal 1 (0000 0001 binary), tha bottom bit is set. A decimal 2 (0000 0010 binary) sets bit 2. A decimal 3 (00000011 binary) sets bits 1 and 2 and so on.

So what does all this mean? It means that when we PEEK at an odd address in the buffer, we see a codad attributa of tha ASCII character in the mamory location just preceding it.

Let's look again and find out wbat the different bits mean:

128 - □ Flash
064 - □
032 - □ Background
016 - □
008 - □ Intensity
004 - □
002 - □ Foreground
001 - □ Underline

If the bottom 3 bits are set (1+2+4) tha cbaracter is normal white on black.

If tha 5th, 6th, and 7th bits are sat (16+32+64=112) the chor-octar is reversed (black on grean, bockground is ON, foreground is OFF).

If wa take a normal character and sat the top "flash" bit, the attributa changes from 7 (1+2+4) to 135 (1+2+4+128). If we than sat tha 4th "Intensity" bit, we will hava a high intensity flashing character with attribute 143 (1+2+4+8+128).

If we set tha bottom underline bit only, we will hava a normal underline character. If we then set the Top bit our character will flash with an underline (attribute 129). Etc. Do you follow the grand plan?

To get a better feeling for all this LOAD in the COLOR 1 program from Chapter 37 and make the following changes:

```
21Ø  DEF SEG = &HBØØØ ' SEGMET IS
     MONOCHROME DISPLAY BUFFER

22Ø  PRINT
23Ø  FOR X=Ø TO 3Ø STEP 2
24Ø  IF X=16 THEN PRINT
25Ø  PRINT PEEK(X); PEEK(X+1),
26Ø  NEXT X
27Ø  PRINT : PRINT
```

SAVE as COLOR2.

. . . and RUN

We immediately recognize the numbers 67,79,77,80, etc as the ASCII codes for the letters of the word "COMPUTER". The other numbers are the ettributes we just learned. For example the first "M" is high intensity so its ettribute is 15 (1+2+4+8), and the bottom 4 bits are set.

POKEing Characters

Now thet we heve done some PEEKing, let's do some POKEing to the video screen. ENTER this short NEW program:

```
1Ø DEF SEG = &HBØØØ ' 45Ø56 DECIMAL
   = 72Ø896 ABSOLUTE
2Ø CLS
3Ø FOR X = Ø TO 255
4Ø POKE 2*X, X
5Ø NEXT X
6Ø LOCATE 6,1
```

. . . and RUN

Nothing new here. But look carefully at positions 7-13 and 28-31. We discovered some new characters! We cen use these fancy new characters only by POKEing to the video memory. For example let's see some of these codes in action. Type from the command level:

```
PRINT CHR$(3Ø) ,
```

the cursor jumps up end pertly ereses what we typed. 3Ø is the code for cursor up. Now type:

```
POKE 15ØØ,3Ø
```

e triangle appears to the right. Position the cursor to the left of the triangle and type:

```
1ØØ PRINT "
```

Using the Del key on the key pad, move the triangle until it is against the quote marks. End this line with a "; and Enter. Now type:

```
GOTO 1ØØ
```

What happened? The cursor jumps up just like we PRINTed CHR$(3Ø). Now do a LIST. Line 1ØØ now says:

```
1ØØ PRINT "1
```

Strange.

Exercise:

Write e program which displeys the word POKE centered in the top of the video display, using the POKE stetement insteed of PRINT.

Debugging Programs

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Is it Further To Boca Raton Or By Bus?

Sterting with the least likely possibility - is the Computer itself working properly? Chances are very high that the Computer is working perfectly. There are several very fast weys to find out.

A. Type

```
PRINT FRE(Ø)
```

If there is no program loaded into memory, the enswer should be:

```
33402
```

Or the correct value previously noted for your system. If there is e progrem loaded, the answer should be some velue less than 33402.

If the answer is more than 33402 (assuming of course we heve not edded more memory), there mey be trouble. Or, it's possible that the answer is e negotive number . . . same solution.

Possible Solution

In either of the ebove cases, shut the Computer off completely. (Or, as they say in the big time, "Take it ell the wey down.") Let it sit for e full minute before turning it on egain.

Turn the mechine beck ON, type NEW and try the PRINT FRE(0) test egein. If the results are the seme, there is probably a chip failure that will require professional troubleshooting and replacement.

B. One Last Try

Before full panic sets in, however type NEW and enter this program. It assigns every free memory location in RAM e specific value, then reeds that value back out onto the screen.

Type (very carefully):

```
5 DIM A(83ØØ)
1Ø FOR X = 1 TO 83ØØ : A(X) = X : NEXT X
2Ø FOR Y = 1 TO 83ØØ : PRINT A(Y);
3Ø IF A(Y) - A(Y) <>1 THEN PRINT "BAD" : BEEP
4Ø NEXT Y
```

. . . and RUN

After e short wait for the array to "spin-up", the monitor should display:

```
1 2 3 4 5 6 7 8 (etc. through 8300)
```

If the word "BAD" eppears on the screen, we moy heve found the problem.

You will probably want to enter this test program into your computer, try it out before you need it, then save it on disk or tape es "MEMTEST" and hope that you won't . . . (need it, thet is).

Video Display Problems?

The Video Displey is very similar to e television set. It has edjustments for brightness and contrast right on the front of the monitor.

Idiot Here—What's Your Excuse?

Of course you don't make silly mistakes! Now thet's settled, 1. Is everything plugged in? Correctly? Firmly? 2. Are the recorder batteries fresh (if you're using batteries)? 3. Is the recorder volume level properly set? 4. Is the recorder tone switch on "high"? 5. Are you using "legal" commends? if so . . . Go welk the dog, then check it ell over egein.

If . . . Then

If the trouble was not found in the cockpit or with the hard-
ware, thera is probably something wrong with your program.
Dump out the troublesome program. LOAD in one thet is known
to work end RUN it as a final herdwere and operator check.

Common Errors

Lat's look et some of the common sources of "computar-
detected errors".

1. Assume the error is in a PRINT, or INPUT statement. Did
   you:
   a. Forget one of the needed pair of quotation marks?
      EXAMPLE:
      1Ø PRINT "ANSWER IS, X: GOTO 5
      ERROR: No ending quotation mark after IS
   b. Use en illegal variable neme?
      EXAMPLE:
      1Ø INPUT 6G
      ERROR: Must be recognizable by the Computer.
   c. Forget a semicolon or comma separating variables or taxt, or
      bury the semicolon or comme inside quotation marks?
      EXAMPLE:
      1Ø PRINT "THE VALUE IS "V X
      ERROR: A semicolon is missing between V and X
      (so the variables ara not properly separeted.)
   d. Forget the Line numbar, accidentally mix a letter in with tha
      number, or use e Lina number larger than 65529?
      EXAMPLE:
      72B3 PRINT "BAD LINE NUMBER."
      ERROR
   e. Accidentally have e double quotetion mark in your text?
      EXAMPLE:
      1Ø PRINT "HE SAID "HELLO THERE."
   f. Type e Line more than 255 charecters long?
   g. Misspell PRINT or INPUT? (It happans!)
   h. Accidentally type e stray character in the Line, especielly
      an extra comma or semicolon?
2. If the error is in e READ stetament, elmost ell the previous
   possibilities epply, plus:
   a. Is there really a DATA statement for the computer to read?
      Remember, it will only read a piece of DATA onca unless it
      is RESTOREd.
      EXAMPLE:
      1Ø READ X,Y,Z
      2Ø DATA 2,5
      ERROR: There are only two numbers for the Computer to
      read.
      If we mean for Z to be zero, we must say so.
      2Ø DATA 2,5,Ø
3. If tha bad area is a FOR-NEXT loop, most of the pravious pos-
   sibilities elso epply, plus:
   e. Do we have e NEXT statemant to match the FOR?
      EXAMPLE:
      1Ø FOR A=1 TO N
      ERROR: Where's the NEXT A?

IF YOU KNOW WHAT YOU WANT . . .

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Some of these FOR-NEXT loop errors won't cause actual error messages; instead your program may wind up in endless loops, requiring the use of the BREAK key.

b. Do you have all the requirements for a loop—e starting point, an ending point, a variable name, and a STEP size if it's not 1?
   EXAMPLE:
   ```
   1Ø A=1 TO N
   ```
   ERROR: Must have a FOR and a NEXT.

c. Did you accidentally nest 2 loops using the same veriable in both loops?
   EXAMPLE:
   ```
   1Ø FOR X=1 TO 5
   2Ø FOR X=1 TO 3
   3Ø PRINT X
   4Ø NEXT X
   5Ø NEXT X
   ```
   ERROR: The nested loops must have different variables.

d. Does a variable in a loop have the same letter as the loop counter?
   EXAMPLE:
   ```
   1Ø A=22
   2Ø FOR R=1 TO 5
   3Ø R=18
   4Ø Y=R*A
   5Ø PRINT Y
   6Ø NEXT R
   ```
   ERROR: The value of R was changed by another R inside the loop, and NEXT R was overRUN, since 18 is larger than 5.

e. Did you nest loops incorrectly with one not completely inside the other?
   EXAMPLE:
   ```
   1Ø FOR X=1 TO 6
   2Ø FOR Y=1 TO 8
   3Ø SET (X,Y)
   4Ø NEXT X
   5Ø NEXT Y
   ```

4. If the goofed-up statement is an IF-THEN or GOTO
   a. Does the Line number specified by the THEN or GOTO really exist? Be especially careful of this error when you eliminate a Line in the process of "improving" or "cleaning up" a program.

5. The ERROR comes back as FRE(0) (Out of memory) but the PRINT FRE(0) indicetes there is room left in memory. If we get an error and are using an array, **extra room (up to hundreds of bytes) has to be left for processing.** You have probably overRUN the amount of available memory.

6. The ERROR comes back as SUBSCRIPT OUT OF RANGE.
   a. Did you exceed the limits of one of the built-in functions?
   b. Did one of the values on the Line exceed the maximum or minimum size for numbers?

   To find out whether you did any of these things, PRINT the

values for all the variables used in the offending Line. If you still don't see the error, try carrying out the operations indicated on the Line. For example, the error may occur during a multiplication of two very large numbers.

These certainly aren't all the possible errors one can make, but at least they give us some idea where to look first. Since we can't completely avoid silly errors, it's necessary to be ehle to recover from them as quickly as possihle.

By the way . . . a one-semester course in beginning typing can do wonders for your programming speed and typing accuracy.

From The Ridiculous To The Sublime:

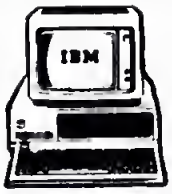
All the computer can tell us is that we have (or have not) followed all of its rules. Assuming we have followed all the rules, the Computer will not ask "Questions"—even if we're asking it to do something that's quite silly and isn't at all what we intended. It will dutifully put out garbage all day long if we feed it garbage—even though we follow its rules. Remember GIGO (Gerbage In, Garbage Out)? If the program has no ohvious errors, what might be the matter?

Typical "unreported" errors are:

1. Accidentally reinitializing a variable—particularly easy when using loops.
   EXAMPLE:
   ```
   1Ø FOR N=1 TO 3
   2Ø READ A
   3Ø PRINT A
   4Ø RESTORE
   5Ø NEXT N
   6Ø DATA 1,2,3
   ```
2. Reversing conditions, i.e. using "=" when we mean "<>", or "greater than" when we mean "less than."
3. Accidentally including "equals", as in "less than or equals", when you really mean only "less than."
4. Confusing simlarly named variahles, particularly the variable A, the string A$, and the array A(X). They are not ot all relot-ed.
5. Forgetting the order of program execution—from left to right on each Line, but multiplications and divisions elways having priority before additions and subtractions. And intrinsic functions (INT, RND, ABS, etc.) having priority over everything else.
6. Counting incorrectly in loops. FOR1=0 TO 7 causes the loop to be executed eight not seven, times.
7. Using the same variable accidentally in two different places. This is okay if we don't need the old variable any more, hut disastrous if we do. Be especially careful when combining programs or using the specIal suhroutines.

But how do we spot these errors if the computer doesn't point them out? Use common sense and let the computer help you. The rules to follow are:

1. Isolete the error. Insert temporary "flags." Add STOP, END, and extra PRINT statements until you track the error down to one or two Lines.
   EXAMPLES OF USEFUL FLAGS:
   ```
   299 PRINT "       LINE #299"
   399 IF X<Ø THEN PRINT "X OUT
       OF RANGE AT #399" : STOP
   ```
   Line 299 will help us check whether the Line immediately Line 299 is executed. This helps us follow program



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flow. Line 399 might be used to locate the point where X goes out of range.

Although the details would be diffarent for your program, these techniques can be epplied easily.

2. Meke your "tests" as simple as possible. Don't add complications until you've found the error.
3. Check simple cases by hand to test your logic, but let tha Computer do tha hard work. Don't try to wade through complex calculations with pencil and paper. You'll introduca mora new mistakes than you'll find. Use tha calculetor mode, or a separate hand celculator to do that work.
4. Remember thet wa cen force tha Computer to stert RUNning e program et any Line number we choosa. Just type:

   RUN ###

   (where ### represants tha desired Lina number). This is e useful tool for working your wey back through a program. You give the veriables ecceptable values using calculetor-mode statemants, and then RUN the progrem starting from some point midwey through tha program flow. If the answers are whet we expect, then the error is before the "test point" you've created. Otherwise, the error is after tha test point.
5. Remember also thet it's not necassary to LIST the antire program just to get a look at the one section of it. Just type:

   LIST ###-###

   (whare ### tells the Computar on which Linas you'd like to start end end tha LIST).
6. Practica "defensiva progremming." Just bacause a program "works okay," don't assume it's dependable. Programs that accept INPUT dete and process it can be aspecielly deceptive. Maka a point of checking a new program at all the critical places.

   Exemplas: A squera root program should be checked for INPUTs less than or equel to zero. Meth functions we heve programmed should be checked at points where the function is undefined, such as TAN(90).

Beware Of Creeping Elegance

Progrems can grow to become more and more elegant with the ego reinforcement of the progremmer as success follows succass. With this "creeping elegance" comes increased chence of silly errors. It's fun to let your mind wander and edd on some more program here, and some more there, but it's easy to lose sight of the purpose of the program. It is et times like this when the flow chert is ignored and the trouble begins. Nuff said.

We'll leave some spece here to meke notes on your own debugging and troubleshooting ideas . . .

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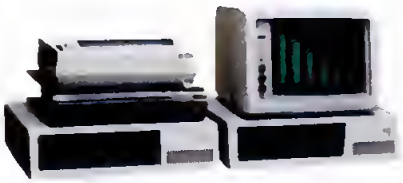

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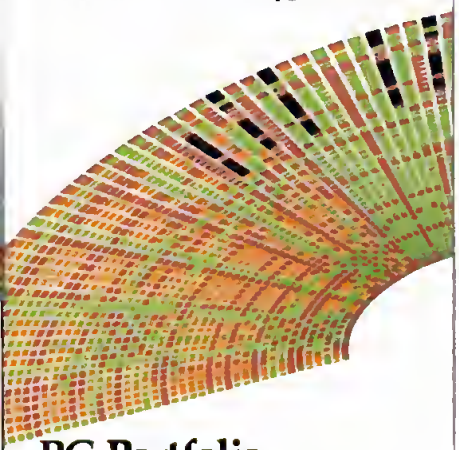

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Wish List

An IBM-compatible CRT that could be flopped over to one side to change the format for graphics.

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Marc Seidel
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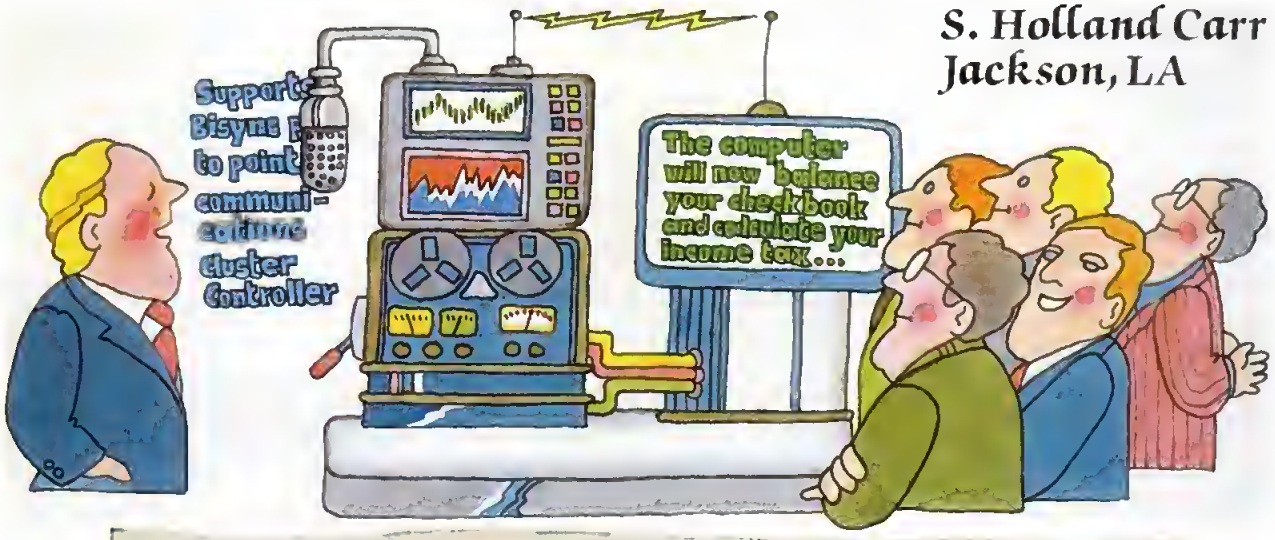

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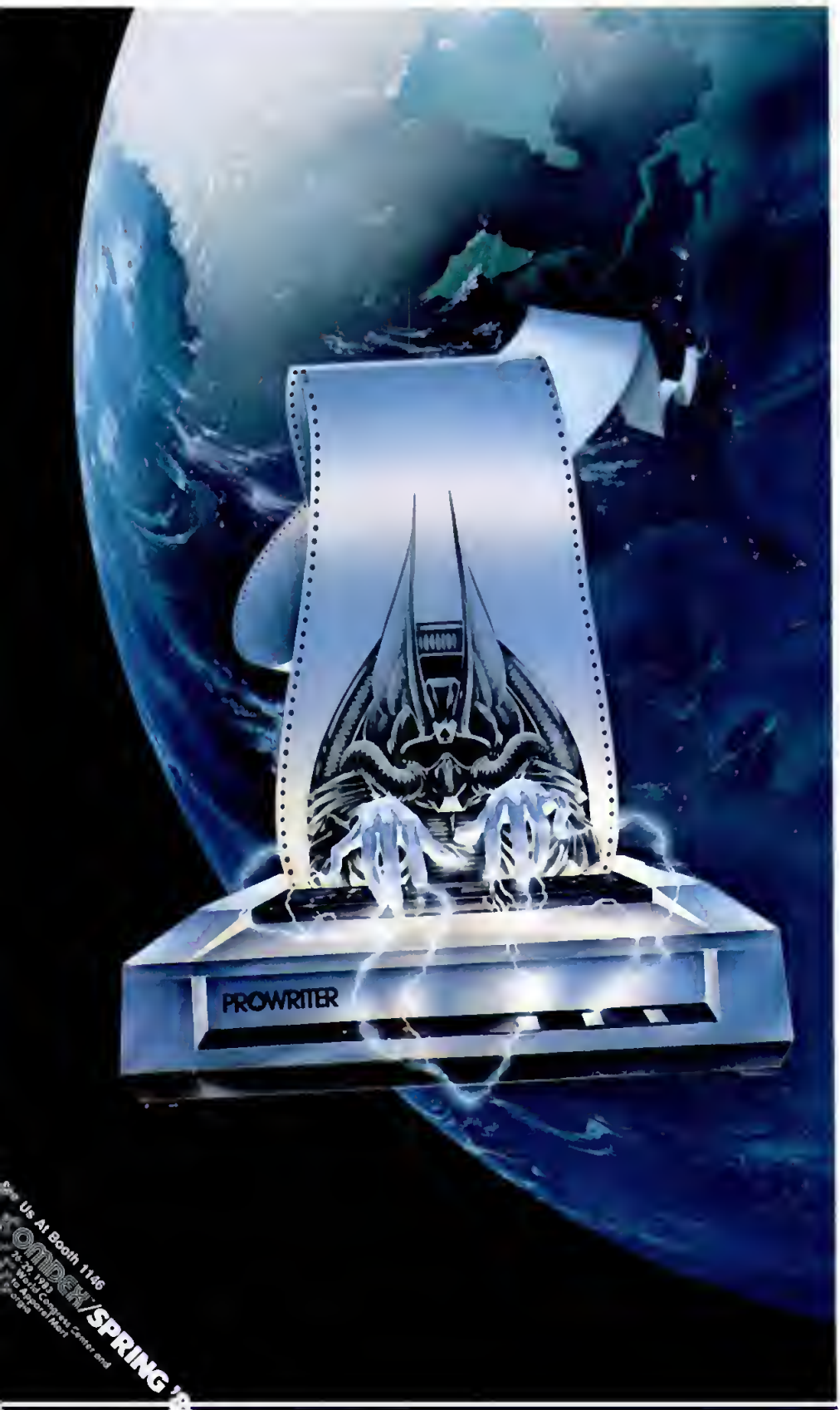

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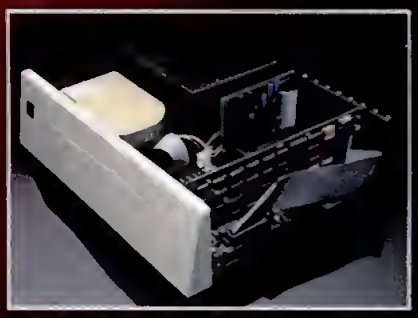

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